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Five hundred and fifty-third Meeting.

May 30, 1865. — ANNUAL MEETING.

The PRESIDENT in the chair.

The Report of the Council upon the changes which had occurred in the Academy during the past year was presented and read by the Corresponding Secretary, as follows: —

In our annual survey of the changes which have taken place in the membership of the Academy, our thoughts naturally turn in the first instance to the losses which we have sustained by death. These, although less numerous by one half than in the year preceding, are still severe.

The four names which now disappear from the roll of Resident Fellows are those of Messrs. *Bartlett* and *Bond* of the first Class, of *Everett* and *Quincy* of the third; — two taken from us in their prime, and two in the fulness of years and honors.

Only two Associate Fellows have deceased, the astronomer *Gilliss*, and the venerable *Silliman;* and only one Foreign Honorary Member, the venerable astronomer *Struve.*

Taking into view the important services rendered to Astronomy by Messrs. Quincy and Everett, it will be noticed that the losses of the past year fall peculiarly upon that department of science.

WILLIAM PITT GREENWOOD BARTLETT, one of the youngest members of our mathematical section, died at Cambridge on the 13th of January last, just as he was entering upon a promising scientific career. He was born at Boston, on the 27th of October, 1837, entered Harvard University in the summer of 1854, and graduated with honors in July, 1858. He soon entered into the corps of computers for the American Ephemeris, and was assiduously engaged in this work until his decease. He contributed to Runkle's Mathematical Monthly some valuable papers on the elements of Quaternions, and to the Memoirs of this Academy a paper on Interpolation. In the Nautical Almanac Office he had charge of the Time-stars and the Circumpolar Stars; and he showed great ability and industry in preparing their Ephemeris and tables. The character of his work is highly eulogized by the simple statement of the fact, that it was left in such condition that another computer could take it up, without the loss of any of Mr. Bartlett's labor, at the point where it was dropped through the sudden and fatal illness by which a life of great promise was cut short.

George Phillips Bond, the worthy successor of his father, the first director of the Cambridge Observatory, died, of consumption, on the 17th of February last, a few months less than forty years old. He was born at Dorchester, on the 20th of May, 1825, and was graduated at Harvard University in the summer of 1845. He began to make observations as early as the year 1842, at the temporary Observatory on Quincy Street, where he soon took the place of his deceased brother, W. C. Bond, Jr., a young man of high promise as an astronomer. After graduation, and upon the permanent establishment of the Observatory, George Bond took the post of Assistant Observer, which he held until 1859, when, upon the death of his lamented father, he was called to succeed him as Director. Thus his whole life, even from boyhood, was devoted to astronomical labors in connection with the Observatory which the Bonds, father and son, have made illustrious. Upon them devolved the heavy task of organizing the new establishment, and of carrying it on with means in slender proportion to its work. Suffice it to say, that the high position which the Observatory took under the direction of the elder Bond was maintained under the younger. To its interests, and to scientific labors in connection with his official duties, he gave himself, from first to last, with entire devotion.

The most important of his scientific investigations are: —

1. Those relating to the mathematical theory of some portions of Astronomy, especially his papers on Cometary Calculations, and the Method of Mechanical Quadratures (in which he anticipated a valuable improvement afterwards given independently by Encke), and that on the use of Equivalent Factors in the Method of Least Squares. To this category belong in part his investigations upon Saturn's rings, which form the first step towards the present state of the problems connected with that system.

2. The Reduction of the Observations made for the United States Coast Survey Chronometric Expeditions between Cambridge and Liverpool, effected under his direction. Upon these depend the most trustworthy American longitudes.

3. The Observations of Zones of small Stars. He mainly prepared the plan for observing and reducing these zones, and even graduated the mica scales employed in them. He also made many of the observations, — the most of the published portion, and a large share of those still in manuscript.

4. The two works on the Comet of Donati and the Nebula of Orion are, however, his most important contributions to astronomical science. The former commanded the general admiration of astronomers as a full and faithful monograph of the physical phenomena of that celebrated comet, and was crowned with the highest honors by the Royal Astronomical Society in the recent award of its gold medal. The latter work, — understood to be complete as to the researches, but the exposition of which his waning strength did not permit him to finish, — it is hoped may, in the main, yet be given to the world, to vindicate the essential accuracy of his father, and to reflect additional lustre upon his own memory.

The spirit and personal characteristics of Professor Bond may be expressed in few words. He was a remarkably patient and industrious as well as skilful investigator, and was ever anxious that his works should possess the qualities, now so imperatively demanded, of unity and completeness. That he did so much for science, and did it so well, during the few years that were allotted to him, must have been partly owing to an extreme reluctance to dissipate his powers by beginning new works while old ones were still unfinished. Science to him was not a pastime, but a serious calling, to be pursued with utmost conscientiousness and singleness of purpose. These characteristics were strikingly exemplified in the latter months of his life, in the perseverance and earnestness with which, under great physical weakness and constant suffering, he continued to the last his work upon the nebula of Orion, dictating to and directing his amanuenses long after the strength to write was gone from him. He was ever watchful of the interests of the institution committed to his charge, and strict in the performance of every duty. All who knew him well can testify to the great simplicity, purity, and uprightness of his character. He was deeply penetrated with the spirit of Christianity, and was a devout member of the Episcopal Church.

He visited Europe first in 1851, and again in 1863. In 1851 he observed the total eclipse of that year in Sweden, and visited the principal Observatories of the North of Europe. In 1863 he spent a few months in England and Germany, renewing personal intercourse with old friends and correspondents, and forming new ties, too soon, alas! to be severed.

Edward Everett was born in Dorchester, Massachusetts, on the 11th of April, 1794, and was graduated at Harvard University with the highest honors in 1811. In 1812 he was appointed Latin tutor at the University. Meanwhile he had devoted himself to the study of Divinity, and in 1813 he was installed as pastor of Brattle Street Church in Boston. In 1815 he was elected Professor of the Greek Language and Literature at Cambridge, and soon afterwards embarked for Europe to prepare himself, by study in Germany, and by travels in Greece and other parts of the Old World, for the duties of this Professorship. He had hardly entered on his twenty-first year when he was thus called to quit the clerical profession; but he had already won the highest reputation as a pulpit orator, and in 1815 had published an elaborate defence of Christianity, in a volume of five hundred pages, which would have done no discredit to the most mature theologian of the time.

Returning from Europe in 1819, he proceeded at once to the discharge of his duties as Greek Professor in Harvard University, where he acquired fresh distinction both as an orator and a scholar by his brilliant lectures on Greek literature. He found time also to publish a Greek Grammar translated by himself from the German of Buttmann, and a Greek Reader based upon that of Jacobs. In 1820, while still holding this Professorship, he assumed the editorial charge of the North American Review, to whose pages during the four following years he contributed about fifty articles. Fifty or sixty articles were contributed by him to the same Review in subsequent years after he had ceased to be its editor.

In 1824, Mr. Everett was chosen a Representative from the Middlesex District in the Congress of the United States, and continued to serve his fellow-citizens in that capacity for more than ten years. His eloquent speeches on almost all the great political questions of that period, and his able reports as chairman of the Committee of Foreign Affairs, would have been enough to secure him a permanent national reputation, had this been his only sphere of public service.

In 1835, Mr. Everett was elected Governor of Massachusetts, and held that office with great dignity and distinction for four years. Failing of a re-election by only one vote, he embarked for Europe in 1840 with a view to his own health and that of his family, and not without plans of literary labor which he hoped to accomplish in Italy. There is the best reason for thinking that "Rome in the Times of Cicero" was the subject of a work which he had proposed as the occupation of the period of his residence abroad. But public employment was again destined to interrupt his literary labors. In 1841, he was appointed to represent his country at the Court of St. James, where he remained for four years as Minister Plenipotentiary, and where he found an ample field for displaying his abilities as a diplomatist as well as his accomplishments as a scholar and his eloquence as an orator.

Returning home in the autumn of 1845, Mr. Everett was met with the appointment of President of Harvard University. He accepted this office with reluctance, but he administered its difficult duties with the greatest assiduity and ability for three years, when the state of his health compelled him to resign it.

In 1852, on the death of Mr. Webster, Mr. Everett was summoned to Washington as Secretary of State of the United States, and conducted the foreign affairs of the country with great brilliancy during the brief term which remained before the expiration of President Fillmore's administration.

In 1853, he was elected a Senator of the United States for six years by the Legislature of Massachusetts, but his health proved insufficient for the arduous labors of Congress during that exciting period of our national affairs, and in the summer of 1854 he resigned his seat, and retired finally to private life.

This summary statement of Mr. Everett's official career, distinguished and varied as that career was, furnishes, however, a very inadequate idea of his life and labors even during the years to which it relates. While he always discharged the duties of the successive offices to which he was called with conscientious and most exemplary fidelity, he by no means confined himself to the mere routine of official service. On the contrary, it was during this very period that he achieved the highest distinction as a scholar and an orator by efforts quite apart from the duties of public station. In the three noble volumes of his works already published there will be found nearly a hundred orations, speeches, or lectures, upon almost every variety of topic, moral, historical, literary, or scientific, delivered during these thirty years of his official career, from 1824 to 1854, hardly one of which has any relation to the offices which he held. They were purely labors of love, superadded to those of office, and undertaken voluntarily in the cause of popular education and improvement. It is hardly too much to say, that had Mr. Everett held no office during this whole period, the record of his life would still have exhibited an amount of work done, and admirably done, which would have insured him a most grateful remembrance and a most enviable reputation with posterity.

Nor was the private life of Mr. Everett, when he finally withdrew from all official position, a life of retirement or inaction. Indeed, it may be doubted whether he was ever more actively or more successfully employed in serving the public than during the last ten years of his life, when he was free from all official obligations. As President of the Board of Trustees of the Public Library of Boston, and as one of the Overseers of the University at Cambridge, he continued to render the most valuable aid to the cause of popular education. As a lecturer before many of our mercantile, literary, and charitable associations, as a speaker at almost all our great anniversary festivals and occasional meetings, and as a contributor to the public journals of his own or other cities, he found ample opportunities for expressing his views on the various questions of the day, (and he expressed them with more independence and more weight as a private citizen of the highest accomplishments and largest experience, whom all honored and respected, than if he had held the most important and distinguished office in the gift of the people.) Among the public addresses delivered by him at this period of his life, there is, perhaps, none of more commanding excellence than the one which he pronounced in August, 1856, before the American Association for the Advancement of Science, on the occasion of dedicating the Dudley Astronomical Observatory, — a discourse which for felicity and scope of illustration and for effective oratory may well be ranked among the most brilliant of the contributions which science owes to literature and eloquence. During a portion of this period of his private life he devoted himself particularly and with the greatest success to the collection of a fund for the purchase of Mount Vernon, and for securing the home and the grave of Washington as the property of the nation. To this end he visited almost all the great cities of the Union, delivering a brilliant discourse on the character of the Father of his Country wherever he went, and contributing the proceeds of every such occasion to the Mount Vernon Fund. It was to him more than to any or all other persons that the ultimate accomplishment of the object was due. On the breaking out of the Rebellion, four years ago, Mr. Everett seemed to consecrate himself, and with a new earnestness, to the service of his country, and his voice, his pen, his personal influence and example, were of inestimable value to the cause of the Union. He was not spared to see the final triumph of that cause; but he lived to be gladdened by not a few of those successes which rendered the ultimate issue only a question of time. He witnessed the rescue of East Tennessee from the Rebel forces, and forthwith devoted himself to the collection of a fund of a hundred thousand dollars for the relief of that afflicted and devastated region. He witnessed, still later, the capture of Savannah by the Federal arms, and allowed no considerations of health or of private business to prevent his uniting with his fellow-citizens at Faneuil Hall in making arrangements for sending food to her starving people. On this occasion his admirable and forcible appeal proved too much for his strength. He returned home greatly exhausted, and after a few days of suffering was struck with apoplexy on the morning of January 15th, 1865, and died without a struggle.

The highest public honors were paid to his remains. A statue of him was at once ordered by the citizens of Boston, and his memory will be cherished by scholars and by patriots to the latest generation.

Mr. Everett was elected into the Academy in 1820, being then in his twenty-sixth year. He served first as Recording and afterwards as Corresponding Secretary from 1822 to 1828 inclusive, and was its Vice-President from 1846 to 1851. In 1843 he contributed to the Transactions a " Report on the Discovery and Name of an eighth satellite of Saturn."

The Hon. JOSIAH QUINCY closed a long life, for the most part spent in public service, and honored with high distinctions, on Friday evening, July 2, 1864, at his country seat in Quincy, Mass. Born in Boston, February 4, 1772, he had nearly half completed his ninety-third year. His family history is an honorable and distinguished one through the whole period of our American annals. He was in the fifth generation of descent from his ancestor Edmund Quincy, who, with six servants, marking him as a man of consideration for the time, emigrated to Boston with the Rev. John Cotton's company in 1633, and occupied lands in Braintree, now Quincy, a portion of which have to this day remained in the possession of his descendants.

Our late associate was the only child of the honored and lamented young patriot, Josiah Quincy, Jr., who, having shown his fidelity and ability by valuable services to his country just previous to the opening of hostilities in our Revolutionary war, was lost to our cause by his death on his homeward voyage from England, April 24, 1775, at the age of thirty-one years. His son was thus left, when but three years old, to the care of the widowed mother, daughter of William Phillips, an eminent merchant of Boston. She was every way qualified for the trust, and she devoted herself with absorbing fidelity to the oversight of the physical, moral, and intellectual training of her charge. He was sent at the age of six to the then newly established academy at Andover, and after eight years of preparation entered Harvard College in 1786, at the age of fourteen, to graduate in 1790 with the highest honors of his class. He studied law in Boston with the Hon. William Tudor, and in 1793 was admitted to the bar (and entered upon practice), though from the first it seemed as if he was intended rather for a public than a professional career. In the high party strife which marked the period of his maturity, he gave his whole-hearted devotion to the Federalists, and accredited himself through his long life to that fellowship and its succession. During a visit to New York and Philadelphia in 1795, he was presented to Washington, and made the acquaintance of the leaders of the Federal party. In 1797, he married Eliza Susan Morton of New York, living in the happiest domestic relations with her for a period of fifty-three years, which was terminated by her death in 1850. He lost his mother in 1798. He was elected a member of the State Senate in 1804, and was elected to the House of Representatives at Washington in December, 1805, having previously been unsuccessful as the Federal candidate for Congress from his District. For this latter honor he was afterwards a successful competitor with his former rival, and retained his seat by four successive elections, until 1813, when he voluntarily withdrew. His years of this service were years of intensest political excitement, his party being in a small minority, and he himself on a marked occasion having the privilege of proving his fidelity to conscience by voting in a minority of one. During the seven years following he was a member of the Massachusetts Senate, and then for two years Speaker of the House of Representatives, which office he resigned to become Judge of the Municipal Court of Boston. On the second year after Boston had received its City Charter, Mr. Quincy was chosen Mayor. He discharged his trust so faithfully, and with such unsparing hand and voice against abuses, that, after five reelections, he was superseded. He was inaugurated as President of Harvard College, June 2, 1829, and resigned the office after Commencement in 1845, to retire to private life, but by no means to abate his activity or interest in all matters of the public welfare. His lofty and earnest patriotism in the civil war which agitated without clouding his closing years, was but the concentration of the sterling qualities which he had manifested through his whole life. He was an example of the

Roman virtues of integrity and severe rectitude, an ardent champion of universal freedom, and a stern rebuker of every form of corruption and oppression. His last years were crowned with the veneration of the community which he had served so uprightly and wisely in such a variety of ways. He added dignity to each of the numerous offices which he had filled, and won conspicuous distinctions in all of them.

Elected in the year 1803, only twenty years after the establishment of this Academy, he was for many years its senior Fellow. He filled the office of Vice-President for several years, and until near the close of his long life he manifested, by his frequent attendance at the meetings and participation in its business concerns, his lively interest in its prosperity. He may almost be called the founder of the Observatory at Cambridge. He called the elder Bond to the charge of the incipient institution, which the Academy helped to maintain, took a leading part in those measures through which the ampler endowment and equipment of the present establishment were secured, caused to be printed at his own cost the principal part of its three volumes of Annals, and continued to the last his interest and useful services in its behalf as one of its official advisers.

Mr. Quincy's most considerable literary works are, —

1. His "Memoir of Josiah Quincy, Jr.," published in the year 1825.

2. His "History of Harvard University," in two volumes, published in 1840, which passed to a second edition.

3. "Journals and Life of Major Samuel Shaw, first American Consul at Canton," issued in 1847.

4. "History of the Boston Athenæum," in 1851.

5. "The Municipal History of the Town and City of Boston during Two Centuries," 1852, written when in his eightieth year. And still later,

6. "The Life of John Quincy Adams," published in 1858.

Not to enumerate the many pamphlets which proceeded from his vigorous pen, we may mention the last, an "Essay on the Soiling of Cattle," produced in 1859, at the age of eighty-seven.

It is with no ordinary emotion that we now strike from the roll of surviving Fellows the long-honored name of one whose membership of sixty-one years dates back almost to the lifetime of our first President, Governor Bowdoin, and whose literary studies had commenced when this Academy was founded.

Captain James M. Gilliss of the United States Navy, Superintendent of the Naval Observatory at Washington, was born in Georgetown, in the District of Columbia, on the 6th of September, 1811. He entered the Navy in 1827, and made his first cruise in the Delaware, under the command of Captain John Downes. On returning home in 1830, he passed with honor the usual examination, and was appointed a Passed Midshipman. At that time the only instruction provided by the government for Cadets in the Navy was given on board the ships in actual service; and this instruction depended much upon the size of the vessel and the nature of the service. Upon receiving the customary leave of absence accorded to young officers after their first voyage, he entered himself as a student in the University of Virginia, and pursued with success the course of instruction given in this institution, which had at that time among its instructors Doctors Patterson and Bonnycastle. His studies were interrupted near their close by an inflammation of the eyes occasioned by too intense application; and receiving permission to travel, during the continuance of this malady, he visited Europe and spent several months in Paris.

His first public service on returning to the United States was in the Hydrographical Office, then recently established, and in charge of Lieutenant, now Commodore Wilkes. On the departure of that officer in command of the South Sea Expedition in 1838, it was arranged that all phenomena of use in determining longitudes, and of which the voyagers might be able to avail themselves during their progress, should be observed at Harvard College Observatory under Mr. Bond's direction, and at Washington by Lieutenant Gilliss. For this purpose a small building was erected near the Capitol, and furnished with a transit instrument which had been made for the survey of the coast. So faithfully did Lieutenant Gilliss perform his part of this service, that of the whole number of occultations visible at Washington during the absence of the expedition, only one was lost.

The building in which the observations were made, a wooden one, stood near the Capitol on a part of the same elevation. Its proximity to the halls of Congress enabled members of both branches to become familiar with one of the most important operations in astronomy, — its application to the determination of time and of geographical position. This practical exhibition of the uses of an astronomical observatory, aided by the kindly and courteous manners of the director, did much to remove the prejudice which at that time prevailed in our National Legislature against a permanent National Observatory, and to induce

Congress to entertain the project of such an establishment. In 1841 and 1842, Lieutenant Gilliss submitted plans and estimates for the construction of a permanent observatory, and in the latter year the law was passed which authorized the erection and equipment of the present Naval Observatory.

On account of the active and efficient part which Lieutenant Gilliss had taken in the furtherance of this project, he was intrusted with its execution; and in the discharge of this duty he again visited Europe. He there consulted with the most distinguished astronomers concerning the details of his plans, and contracted with the celebrated artists of that time for the necessary instruments, and on his return he superintended the erection of the building and its equipment.

In October, 1844, he surrendered the building and apparatus nearly in the state in which they have since remained to Lieutenant Maury, who had been appointed Superintendent.

Of the observations made by Lieutenant Gilliss with the Coast Survey Transit in connection with the South Sea Expedition, the most important were those for the determination of the right ascensions of the principal stars visible at Washington. The results were published in 1846, and make the first volume of published observations ever printed in this country.

From October, 1844, until April, 1861, when Lieutenant Gilliss succeeded to the superintendence of the Observatory, made vacant by the desertion of Lieutenant Maury, he was constantly employed in duties connected with the various geodetic and astronomical operations of the public service. His chief work, however, executed between 1849 and 1853, consisted in observations of the planets Venus and Mars, made at Santiago de Chile, for the purpose of obtaining a more perfect determination of the parallax of the sun. From a combination of unfavorable circumstances this work did not attain the valuable results which were anticipated. While at Santiago, Lieutenant Gilliss employed the intervals between his principal observations in executing a series of observations upon stars of the southern hemisphere.

On taking charge of the Naval Observatory in 1861, Captain Gilliss proceeded immediately to reform the character of the establishment, which, under the control of his predecessor, had lost much of its astronomical *prestige*, and become mainly a meteorological bureau. Under his supervision a new organization was given to the astronomical department. Series of observations which had been interrupted or discontinued were resumed, and a new spirit was infused into the *personnel* of the establishment, which was also increased in number. Arrangements were made that the work of computation should keep pace with the observations, so that the annual volume should be ready for the press at the end of each year. This was accomplished in every year of Captain Gilliss's superintendence.

In 1863, he ordered from the celebrated artists Pistor and Martins of Berlin a Meridian Circle of larger dimensions than any now in this country. The details of its construction, and the preparations for its proper reception and mounting, were matters of much solicitude to him. Indeed, these were the subjects which most occupied his thoughts at the time his career was so suddenly brought to a close.

He died on the morning of the 9th of February, almost in the act of waking from an undisturbed slumber, without any previous illness or indisposition, and apparently without pain. The previous day had been one of unusual happiness to him, — his eldest son, a captain of artillery, who had been a prisoner since October in the hands of the Rebels, having just been exchanged and restored to him.

We now turn our thoughts to one whose prolonged labors as a teacher and cultivator of science claim our grateful recognition, and whose services as the founder and conductor of the most widely known and valued of American scientific journals entitle him to a distinguished place among the promoters of science in this country.

BENJAMIN SILLIMAN was born in North Stratford (now Trumbull), Connecticut, August 8, 1779, of a family which has resided in Fairfield, in that State, since the early colonial days, and which is believed to have come originally to this country from Switzerland. His father, Gold Selleck Silliman, a distinguished lawyer of Fairfield, held during the Revolutionary war the office of Brigadier-General of the State militia, was intrusted with the protection of the Long Island coast, commanded the troops that were gathered in 1777 for the defence of Danbury, and three years after was taken prisoner, and for several months held in captivity.

The subject of our notice, the younger of the two sons of General Silliman, entered Yale College at thirteen, and graduated at the early age of seventeen. Three years later he was called to a tutorship in the College, and, devoting his leisure to the study of law, he was in 1802 admitted to the bar.

At this critical moment, fortunately for the interests of the College and of science, a more congenial field of labor presented itself to the young college tutor in the rapidly expanding domain of Chemistry; and we can imagine how readily he consented, at the solicitation of Dr. Dwight, the President of Yale, to renounce his proposed profession and to accept the chair of Chemistry, then for the first time established in the College.

To prepare himself for this position he spent some time under the instruction of Dr. Woodhouse, the celebrated Professor of Chemistry in the University of Pennsylvania, and in 1805 made a visit to Europe; in the course of which he attended the lectures of eminent professors in London and Edinburgh, travelled over the mining districts of England, and gathered for the College books, apparatus, and other facilities for illustrating chemical and physical science.

Returning thus equipped, he resumed the duties of the chair in which he had already made a beginning, and entered upon that career as a college teacher and public lecturer, in which his ready and impressive elocution and his attractive presence, as well as the clearness and value of his instructions, soon won the interest of his pupils, and in later years marked him as a popular expounder of science.

In the College lecture-room and laboratory his genial enthusiasm kindled a taste for experimental and natural science, and gathered around him many eager spirits whose scientific labors have in later years given proof of the value of his hearty, enthusiastic teaching.

For some years Professor Silliman's instructions were confined to the department of Chemistry, in which his tact in manipulation was scarcely more remarkable than the delight with which, it is said, he seemed to enjoy his own experiments, as if, like the class, he had never before witnessed them. After a time, he added to the course on Chemistry one on Mineralogy and another on Geology, in both of which he soon surrounded himself with earnest students, of whom not a few in after years became known as diligent collectors or as scientific explorers.

The inspiring influence which Professor Silliman exerted as a college teacher shines forth in the fact that so many of the minds which he aroused to the study of nature have been successful investigators and teachers in different portions of the country, and that all his pupils, whether devoted to science or letters, bear testimony to the interest which he awakened in their pursuits.

Nor was it simply his enkindling influence as an instructor that wrought these results. The kindness and sympathy with which he was accustomed to counsel and help his students he extended to all who were laboring to advance knowledge, cheering them in their studies and in their efforts at original investigation with a generous appreciation no less honorable to him than it was helpful to the rising science of the country.

In estimating Professor Silliman's services as a teacher of science, we should remember that he began his labors when Chemistry was in its infancy, and Geology was but emerging from a chaos of conjectural cosmogonies. When he entered upon his task, he was unprovided with apparatus or specimens, "with scarcely a retort, and only minerals enough to fill a candle-box."

With the intrepidity of a pioneer he set himself to his work, and such was his success in it, that, at the close of the fifty years of almost unbroken service as a college professor, he could not only point to a long array of chemists and geologists whom either directly or indirectly he had helped to train, but to superb collections of minerals and fossils and other materials of instruction gathered for his College mainly through the influence of his enthusiasm and personal popularity.

The characteristics which marked his college lectures were even more conspicuously shown when Professor Silliman was called on to discourse on scientific subjects before a general audience. His brilliant experiments and other illustrations, and the rhetorical attractions of his style, made him one of the most welcome of popular lecturers on Chemistry and Geology, and secured him a large attendance on the courses of lectures which he gave in many of the principal towns of the United States, from Boston as far west and south as St. Louis, New Orleans, and Mobile.

Important as were Professor Silliman's services as a college teacher and officer and as a popular lecturer, his strongest claim to the gratitude of men of science, especially in this country, rests upon the establishment and the maintenance, often under very discouraging circumstances, of the American Journal of Science, better known both in Europe and this country as Silliman's Journal, with which his name continued to be connected until his death, and of which for twenty years he was sole, and for eight years more senior editor.

Founded in 1818 as a quarterly, but for many years past published as a bi-monthly periodical, this journal has for a period of forty-seven years been the leading exponent of the investigations and discoveries of the science of this country. The comprehensive plan set forth in the Prospectus by which the Journal was first heralded marks the sagacious foresight of its author. Sustained for so many years by his untiring perseverance and unfailing hope, and in later times by the editorial ability of his coadjutors and successors, it has held its position as a chosen repository of American scientific thought and activity, and as the faithful exponent of scientific progress in other countries.

Of the services of this journal to American science it is not too much to say, that, more than any other similar publication, it has aided and stimulated our countrymen in their scientific labors, and has made their names and works familiar to men of science abroad, while through the variety and weight of its contributions it has not only won a high reputation among contemporary journals, but has vindicated for our country an honorable place among the communities in which science is most promoted and esteemed.

To have been instrumental towards such results is certainly no slight distinction, and when we remember that the Journal was maintained from the beginning at the pecuniary risk of its founder, and that its publication has been for the most part a financial burden to him, we feel that the generous devotion to science which led him to persevere, in spite of these discouragements, entitles him to our lasting gratitude.

With such various and engrossing labors as teacher, editor, lecturer, and in other modes of helpful activity, it was not to be expected that Professor Silliman could devote much time to original scientific investigation, and perhaps his peculiar gifts of temperament and intellect were such as to find their most useful application in the wider and more social sphere of effort in which they were so earnestly employed.

He however found time to make a number of original experiments and observations, among which may be specially noted the application of the newly invented blowpipe of his friend, Dr. Hare, to the fusion of a variety of bodies which were before regarded as infusible, the discovery of the transference of the particles of carbon from the positive to the negative pole of the galvanic apparatus, and the fusion of the carbon in the voltaic arc; the two last-named facts, though long disputed in Europe, being now generally recognized.

In the field of scientific literature, Professor Silliman's labors, apart from his contributions to the Journal, consist of a Text-Book on Chemistry, in two octavo volumes, which appeared in 1830, and the Notes and Appendices which he added to Bakewell's Geology, republished about the same time, and of which three editions were issued in the course of ten years.

Of Professor Silliman's other publications the most noteworthy are the "Journal of Travels in England, Holland, and Scotland," which appeared in 1810, embodying his observations during the early tour of scientific preparation before referred to, and the narrative of his second "Visit to Europe," published in 1853, both of which, by their genial spirit and literary graces, as well as by the interest of their local, personal, and scientific details, won the favor of readers on both sides of the Atlantic.

It was in the latter of these years that our associate, now venerable from his age as from his labors, resigned his Professorship in the College; but he continued for two years more to discharge the duties of of the chair of Chemistry and Geology, and had thus the rare distinction of extending to half a century a career of active college service.

His remaining years, passed in retirement from academic, and for the most part from scientific labors, showed no abatement of interest in the progress of science and in the promotion of enterprises tending to the moral and material welfare of his fellow-citizens.

The kindness of his nature, growing even more tender as age advanced, combined with a simple, hopeful piety to shed a lustre on the evening of his happy and honorable life.

Taking a warm interest in all great public affairs, he continued to the last to watch the growth of that national life of which in childhood he had witnessed the commencement. Moved by the wrongs of the oppressed, and indignant at the attempt to perpetuate injustice by the overthrow of our government, our venerable colleague came forward at the outbreak of the Rebellion, with all his youthful ardor and the influence of his years and reputation, to second his fellow-citizens in re-establishing the national unity on the basis of equal justice and Christian humanity and truth.

It is a touching proof of his zeal in all that related to the welfare of our soldiers and the success of our cause, that the last public meeting he attended was a service held in behalf of the Sanitary Commission, and that the indisposition which resulted in his death was probably the immediate consequence of his exposure at that time.

Ten days after this, on the morning of November 24, 1864, the day set apart by President Lincoln for a national thanksgiving, while yet the words of patriotism, pious worship, and tender endearment were upon his lips, he passed away.

Thus, at the advanced age of eighty-five, peacefully and beautifully closed the life of one whose labors in behalf of education, science, and social advancement have been inwoven in the history of more than two generations, and will long cause his name to be honored and gratefully remembered.

Last year five distinguished names disappeared from our list of foreign honorary members. During the year now closed we have lost only one.

FRIEDRICH GEORG WILHELM STRUVE, one of the great astronomers of the age, died at Pulcova on the 23d of November last. He was born at Altona in 1793, and was the son of Jacob Struve, a scholar of high reputation, especially as a philologist. He emigrated to Russia at the age of fifteen, and was educated at the University of Dorpat, where he became Professor of Astronomy at the early age of twenty, and began at once his astronomical observations. These were continued, with few interruptions (caused mostly by geodetical work and scientific journeys), until the year 1839, when he was called to the charge of the Imperial Observatory at Pulcova, an institution in some respects the first in the world. He retained the directorship of this celebrated establishment until the year 1861, when, under the weight of advancing years and infirmities, he resigned it to his son, at the close of a half-century of labors of great importance to science and to his adopted country.

In the first place, Struve had no superior among his compeers as an astronomical observer. Even Bessel must yield to him the palm for nicety of work in detail, while in Struve's early volumes of observations the influence of Bessel's great mind is plainly seen. The first three volumes of the " Observationes Dorpatenses " are chiefly occupied with those made with Dollond's transit instrument, and, partly unreduced as they are, they are still indispensable in all researches relating to stars near the pole. Struve's remaining observations at Dorpat are brought into the shape of fully discussed results in his two great works, " Stellarum Duplicium Mensuræ Micrometricæ," and " Stellarum Fixarum imprimis Duplicium et Multiplicium Positiones Mediæ." These almost exhaust the subject of double stars for the years about 1830, and are of the highest historical importance for future astronomy.

The Pulcova observations, of which about fifty thousand have been made by the meridian instruments alone, are now in process of publication. It has been thought well that their results should appear together as a whole, and it is expected that they will put a new face upon many astronomical subjects. Many detached papers have appeared, however, which embody the results of completed investigations.

The geography of Russia, on the other hand, owes very much to Struve. The measurement of the arc of the meridian, of 25° 20′ in length, between Fuglenaes on the Arctic coast and Ismail on the Danube (the largest yet completed, and which may at some future time be prolonged as far south as Constantinople, or even to Crete), was in great part his work; although the names of Jenner, Selander, and Hansteen appear with his on the title-page.

But the chief peculiarity of Russian geography is, that it is founded largely upon astronomical determinations, these taking the place of triangulation in that extensive country. It has been found possible in this way to survey large districts with great expedition, yet in a thorough manner. But for this two things are indispensable, — portable instruments which possess great delicacy, and a corps of observers trained in all the refinements of modern astronomy. Struve incited the makers of such instruments to turn their powers in this direction, while he stimulated their ambition by establishing a workshop at Pulcova to compete with them; and the Repsold vertical circles and the Munich theodolites of small dimensions are now the admiration of astronomers. And Dorpat and Pulcova were the best possible training schools for the young astronomers who were to use these instruments.

It is an interesting fact to us, that the first determination of the longitude of San Francisco, which was within ten miles of the truth, was calculated under Struve's direction, from observations made by his pupil, Preuss.

In fine, it may fairly be said that Russia has done more for her own geography than any other country, and that Struve has been more effective in this work than any other Russian. Without prejudice to his astronomical reputation, it may be concluded, that what Bessel was to proper astronomy Struve was to astronomical geography.

Struve was no recluse, but he enjoyed society in a high degree. To his personal friendship with the Emperor and with the leading statesmen of the time is owing much of the liberality with which his various scientific undertakings were supplied. Those who have visited the astronomical colony at Pulcova have invariably returned charmed by the genial hospitality of the head of the establishment, — a hospitality most freely dispensed to all who had in any degree claims upon it, and which made the great Observatory a delightful home for the time to those who came from foreign lands.

The elections into the ranks of the Academy during the past year have been unusually few; consisting of two Resident Fellows, of whom one is placed in Class II. Section 3, one in Class II. Section 4. Three Foreign Honorary Members, all in Class I., are placed severally in Sections 1, 2, and 3 of that Class.

One of the members (Professor H. D. Rogers of Glasgow) has been transferred from the list of Resident to that of Associate Fellows, in Class II. Section 1.

In conclusion, the Council submitted a nomination to fill the vacancy in the list of Foreign Honorary Members made by the decease of M. Struve; also a nomination to the list of Associate Fellows.

Professor Lovering, as Chairman of the Committee of Publication, presented the report of the committee, accounting for expenditures in printing the Memoirs and Proceedings under the appropriations of the past year.

Dr. A. A. Gould, as Chairman of the Library Committee, presented the Annual Report on the condition of the Library.

The Annual Report of the Treasurer, attested by the Auditors, was read, accepted, and ordered to be entered on the records.

The following appropriations were made for the ensuing year: —

For General Expenses	$1,200.00
For the Library	700.00
For Publications	800.00

The following report of the Rumford Committee was accepted, and the vote recommended was passed: —

Whereas, Prof. Daniel Treadwell, of Cambridge, Massachusetts, between the years 1840 and 1845, did devise, execute, and publish certain improvements in the management of heat, by which guns of great strength and endurance were constructed, — especially by the coiling of iron in the direction of its greatest tenacity, and welding the coils by means of moulds and mandrils and hydraulic pressure into a hollow cylinder; whereby a system of construction, before used in small-arms only, was rendered applicable to guns of any calibre, and which is now generally adopted in the manufacture of large cannon; therefore, the Rumford Committee recommend to the American Academy of Arts and Sciences that the following vote be passed: —

Voted, That the Rumford Premium be awarded to Professor Daniel Treadwell, for improvements in the management of heat, embodied in his investigations and inventions relating to the construction of cannon of large calibre, and of great strength and endurance.

The following gentlemen were elected members of the Academy.

To be Resident Fellows: —

Dr. John E. Tyler,	in Class II.	Section 4,
Dr. Edward H. Clark,	“ “ II.	“ 4,
Rev. Edward Everett Hale,	“ “ III.	“ 3,
Mr. George Bemis,	“ “ III.	“ 1,
Hon. Charles Sumner,	“ “ III.	“ 3.

To be Associate Fellows: —

Mr. F. B. Meek, of Washington,	in Class II.	Section 1,
Dr. John W. Draper, of New York,	“ “ I.	“ 3,
Dr. Tayler Lewis, of Union College,	“ “ III.	“ 1,
Dr. S. Weir Mitchell, of Philadelphia,	“ “ II.	“ 3,
Prof. Samuel G. Brown, of Dartmouth Coll.,	“ III.	“ 3,
Rev. Dr. Daniel R. Goodwin, of Philadelphia,	“ III.	“ 1.

Nominations for election into the Academy were presented and read.

The annual election resulted in the choice of the following officers for the ensuing year.

Asa Gray, *President.*
Charles Beck, *Vice-President.*
William B. Rogers, *Corresponding Secretary.*
Chauncey Wright, *Recording Secretary.*
George Livermore, *Treasurer.*
Josiah P. Cooke, *Librarian.*

Council.

THOMAS HILL,
JOSEPH LOVERING, } of Class I.
JOHN B. HENCK,
AUGUSTUS A. GOULD,
LOUIS AGASSIZ, } of Class II.
JEFFRIES WYMAN,
ROBERT C. WINTHROP,
GEORGE E. ELLIS, } of Class III.
ANDREW P. PEABODY,

Rumford Committee.

JOSEPH LOVERING,
JOSEPH WINLOCK,
MORRILL WYMAN,
WOLCOTT GIBBS,
WILLIAM B. ROGERS,
CYRUS M. WARREN,
FRANK H. STORER.

Committee of Finance.

ASA GRAY,
GEORGE LIVERMORE, } *ex officio*, by statute.

No ballot was taken for the third member of this Committee.

The other Standing Committees were appointed on the nomination of the President, as follows: —

Committee of Publication.

JOSEPH LOVERING,
JEFFRIES WYMAN,
CHARLES BECK.

Committee on the Library.

AUGUSTUS A. GOULD,
CHARLES PICKERING,
JOHN B. HENCK.

Committee to audit the Treasurer's Accounts.

THOMAS T. BOUVÉ,
CHARLES E. WARE.

Professor Gray presented the following paper : —

Characters of some New Plants of California and Nevada, chiefly from the Collections of Professor William H. Brewer, Botanist of the State Geological Survey of California, and of Dr. Charles L. Anderson, with revisions of certain Genera or Groups. By ASA GRAY.

The diagnoses of two or three of the following species, of the collections of 1860 – 1862, have already been published in the Proceedings of the California Academy of Natural Sciences, Vol. 3, pp. 101 – 103. The plants described are from the collections of the Geological Survey when not otherwise specified.

ARABIS (LOMASPORA) PLATYSPERMA : humilis e basi suffrutescente ; foliis cum caule pube stellata canescentibus spathulatis integerrimis, summis oblongis arcte sessilibus obtusis ; racemo paucifloro ; (petalis roseis ;) siliquis arrectis rectisque lato-linearibus (1½ – 2½ poll. longis, lin. 2½ latis) acuminatis planis, valvis laxe reticulatis ; stigmate sessili ; seminibus amplissime alatis. — Sierra Nevada, on Mount Dana, alt. 13,227 feet, and above Ebbett's Pass.

STREPTANTHUS POLYGALIODES : *Eucilsia, Dipterochlœna,* glaber, paniculato-ramosus ; foliis filiformibus integerrimis, nonnulis basi subamplexante sagittatis ; racemis spiciformibus ; calyce luteo petala purpurascentia subæquante, sepalis duo exterioribus maxime dilatatis subcordato-rotundatis, interioribus oblongo-lanceolatis acuminatis ; siliquis (immaturis) angustissime linearibus stylo brevi apiculatis. — On very dry hillsides, in serpentine soil, along the Tuolumne River. A remarkable species, with the petals, &c., of the *Euclisia* section, but, on account of its peculiar calyx, rather to be distinguished as of a separate section. The light-yellow and apparently scarious petaloid sepals are of two very different shapes ; the inner pair nearly as in other species of the genus ; but the outer much dilated, apparently nearly flat, and not unlike the wings of some species of *Polygala,* about 3 lines in length and breadth, and as it were enclosing the rest of the flower ; the tips of the purplish or white and purple petals, and the oblong-sagittate blunt anthers barely exserted. A pair of the filaments frequently connate. The plant is probably an annual.

STREPTANTHUS PROCERUS, Brewer. *S. flavescens,* Gray, in Proceed. Amer. Acad. 6, p. 186, as to the "very large or luxuriant form gathered at the coal-mine near Monte Diablo by Dr. Brewer." This is doubtless a truly distinct species, growing six or seven feet high in alluvial soil, the greenish-white flowers fully half an inch long, the stem glabrous and glaucous.

THELYPODIUM (PACHYPODIUM, Nutt.) BRACHYCARPUM, Torr. (in Wilkes's S. Pacif. Ex. Exped. Bot. W. Amer. t. 1); caule virgato; foliis caulinis parvis crebriusculis sagittatis integerrimis erectis; racemo elongato angustissimo-spiciformi; pedicellis calyce brevioribus; sepalis linearibus; petalis angustissime linearibus; antheris mucronatis; siliquis semi- aut sub-pollicaribus, valvis carinato-uninerviis.—Valley of Mono Lake, alt. 6,500 feet. This well-marked species having been rediscovered by Prof. Brewer, a diagnosis is here given, since that of Dr. Torrey is still unpublished, and the plate is little known. Dr. C. L. Anderson has collected it in Nevada, with a very long virgate spike, and with some mature fruit.

SMELOWSKIA? CALIFORNICA: cinereo-puberula, glabrata; radice ut videtur annua vel bienni; caule 1–2-pedali; racemis demum paniculatis; foliis pinnatipartitis, segmentis 5–7 oblongis obtusis sæpe 3–5-lobatis; floribus parvis luteis; calyce deciduo; siliculis pusillis ellipticis oblongisve utrinque acutis stylo brevissimo apiculatis, loculis 1–2-spermis.—On Mount Dana, alt. 10,000 feet, June, in flower; and near Mono Lake, alt. 6,450, July, with young fruit.—With its annual or biennial root, and much the habit of *Sisymbrium canescens*, this would render the genus *Smelowskia* yet less natural; but here it technically belongs. The flowers are only a line long; the elliptical, ovoid, or somewhat fusiform silicles one or two lines long; valves very obscurely one-nerved; cells 2-ovulate. Young seeds oblong.

DRABA EURYCARPA: multiceps, nana, stellato-tomentosa; foliis spathulatis integerrimis in caudice rosulato-confertis; scapo leviter exserto paucifloro; siliquis ovatis stylo subulato acuminatis glabris (½–¾-pollicaribus).—On a peak of the Sierra Nevada south of Sonora Pass, alt. 11,500 feet. In fruit only, the seeds and most of the valves shed. The tufts of leaves (half an inch in length) rise only about an inch above the surface of the ground, and above them the large and silvery partitions of the pods are very conspicuous. Funiculi short, about 10 in each cell.

CLEOMELLA PARVIFLORA: tenuis, diffusa; foliolis cum bracteis simplicibus linearibus; floribus parvis; pedicellis filiformibus elongatis;

capsula obovato-globosa, stipite (vix calycem superante) styloque brevissimis; seminibus lævibus. — Nevada, near Carson City, Dr. C. L. Anderson. The foliage nearly as in *C. tenuifolia*, but a more delicate plant, only about a span high, the flowers and pods only half the size, and the stipe much shorter than in any other species, not half a line in length. Dr. Anderson also sends *C. longipes*, Torr., from Nevada.

LINUM § HESPEROLINON. Spec. 3 Californicæ, annuæ, trigynæ, capsulis 6-locellatis; unguibus petalorum basi tri-appendiculatis. Styli a basi liberi, stigmatibus parvis. Dentes inter stamina nulli. Sepala ovato-lanceolata, herbacea, immarginata, vix uninervia. Flores brevipedicellati. Folia angustissime linearia, subfiliformia, plerumque alterna. Caulis inferne simplex, strictus.

LINUM CALIFORNICUM (Benth., Pl. Hartw. p. 299): glabrum; caule superne in cymam effusam repetito-dichotomam soluto; glandulis stipularibus geminis; sepalis margine subglandulosis; petalis albis roseisve. — Dr. Torrey, in Bot. Mex. Boundary, first noticed the trigynous character, which it shares with the following new Californian species. All three exhibit three little teeth or auricles at the base of the claw of the petals, one on each margin and one adnate to its inner face. The coincidence of these characters invalidates the technical distinction of the genus *Reinwardtia*, — in which, however, the teeth or appendages of the petals according to Planchon (in Lond. Jour. Bot. 7, p. 522), or two of the three according to Bentham and Hooker (Gen. Pl. p. 243), are dorsal.

LINUM CONGESTUM: glandulis stipularibus inconspicuis; caule foliisque fere glabris; floribus in ramis brevibus suberectis capitato-glomeratis; sepalis pubescentibus eglandulosis; petalis roseo-purpureis; stigmatibus brevibus vix incrassatis. — Marin County, coll. H. N. Bolander. Flowers about the size of those of *L. Californicum*.

LINUM BREWERI (Gray in Proceed. Calif. Acad. l. c.); glabrum; caule exili apice confertim paucifloro; foliis raro oppositis; glandulis stipularibus conspicuis; sepalis margine glandulosis; petalis aureis; stigmatibus acutis. — Dry hills of the Monte Diablo range. Plant only a span high, in flower; the fruit not seen.

There might seem to be a fourth species of the group, *L. trisepalum*, of Kellogg, in Proceed. Acad. Calif. 3, p. 42, fig. 10. But his plant is *Helianthemum scoparium*, Nutt.! And his *L. decurrens* is evidently *L. perenne*.

LUPINUS MEIONANTHUS: undique sericeo-incanus; caulibus ut videtur herbaceis vel suffruticosis adscendentibus e radice perenni; foliolis 6 – 9 concoloribus oblanceolatis obtusis; stipulis parvis setaceis; bracteis calyce brevioribus; floribus minimis (vix lineas 3 longis) verticillatis in racemum spiciformem congestis; calyce pedicello longiori ebracteolato, labiis fere integris corollam glabram subæquantibus; carina apice brevi lato obtuso inflexa ciliata; leguminibus ovatis incanis 1 – 2-spermis. — Nevada, near Carson City, Dr. C. L. Anderson. It would be unsafe to describe a new Lupine before the old species are settled, except in a case like this, — a silvery-canescent species with remarkably small flowers. These are blue or purple, with a yellow spot on the vexillum. Leaflets 6 to 11 lines long, mostly equalling the petiole. Legumes half an inch long. Seed with a small hilum.

TRIFOLIUM ANDERSONII: (§ *Lupinaster*) undique albido-villosissimum, cæspitoso-depressum; caudicibus crassis lignescentibus stipulis majusculis scariosis vestitis; foliolis 4 – 6 oblongo- seu obovato-cuneatis mucronatis integerrimis; pedunculis folia adæquantibus; capitulo globoso multifloro; floribus sessilibus; dentibus calycis tubo campanulato sublongioribus subulato-setaceis; corolla roseo-purpurea haud scariosa. — Mountains of Nevada, near Carson City, Dr. C. L. Anderson (1862 and 1864). A most peculiar species, forming tufts a few inches in height, at first nearly acaulescent, but the stout caudices or stems sometimes attaining the length of five or six inches, and ascending or decumbent, leafy, beset, as is the whole plant, with very soft silky-villous hairs; the calyx, &c., very densely so. Petioles and peduncles 1½ to 2 inches long. Leaflets half an inch in length. Head very compact, with an alveolate-squarrose receptacle, the outermost very short bracts forming a vestige of an involucre. Flowers half an inch long; the corolla apparently pink, with paler wings and keel, these adnate by their claws to the tube of filaments. Ovary tomentose, scarcely stipitate: ovules about 5. Legume globular, 1 – 2-seeded.

TRIFOLIUM BIFIDUM (Gray in Proceed. Acad. Calif. supra cit.): villosiusculum seu glabellum; caulibus e radice exili (annua?) diffusis gracilibus; stipulis ovato-lanceolatis setaceo-acuminatis integris; foliolis lineari-cuneatis lateribus rariter dentatis apice bifidis vel excisis mucrone interjecto; pedunculis folia bis terve excedentibus; capitulo nudo 6 – 12-floro; floribus pedicellatis demum reflexis; calycis 5-partiti dentibus subulato-setaceis parce hirsutis corollam roseam scarioso-per-

sistentem subæquantibus. — In a ravine between Monte Diablo and the San Joaquin. Heads about the size of those of the small form of *T. gracilentum*, to which species this is allied.

TRIFOLIUM MONANTHUM: *Involucraria*, pygmæum, parce villosulum, e radice exili (annua?) ramosum; stipulis ovato-lanceolatis subfoliaceis integerrimis 3–5-nervatis cuspidato-acuminatis; foliolis obovato-cuneatis nunc retusis mucronato-dentatis; pedunculo folium haud superante; involucro unifloro (rarius bifloro) fere diphyllo calyce cylindraceo dimidio breviore; corolla albo-purpurascente elongata. — Moist bank by Soda Springs, Tuolumne River, alt. 8,700 feet. A very distinct little species, only about an inch high, the stems or branches terminated by a peduncle of 3 to 9 lines in length. Leaflets 2 or 3 lines long. Corolla half an inch long, twice or thrice the length of the calyx (the teeth of which are broadly lanceolate, spinulose-pointed, and shorter than the tube), somewhat glandular on the elongated tube, not scarious or inflated after flowering. Legume stipitate, two-seeded. Leaves of the involucre mostly two-cleft.

TRIFOLIUM AMPLECTENS, Torr. & Gray, occasionally white-flowered, instead of a nearly sessile 4–6-seeded legume, as in the specimens of Douglas, has it stipitate and with only one or two large seeds (indeed with the ovary biovulate) in those of Coulter, Bigelow, and Brewer. Generally there is a central pedicellate flower, under which is a minute truncate involucel, like the involucre of the following plant; sometimes indeed this involucel is two-flowered, showing a tendency in the head to become proliferous.

TRIFOLIUM DEPAUPERATUM, Desv. (*T. stenophyllum*, Nutt. Pl. Gamb. p. 151?), now identified in California, adds another to the Clovers common to that country and to Chili. Dr. Brewer collected two forms on successive days (April 18 and 19) in the vicinity of Sonoma. One, which is slender and erect from an annual root, well accords with specimens of Gay's *Flora Chilena*, except that the flowers are rather larger and a few more in the head; and the leaflets are longer and narrower; while Fremont gathered (in 1845, no. 235) the exact counterpart of the Chilian plant. Dr. Brewer's other form is more tufted and decumbent, the root as if perennial. The involucre in *T. depauperatum* is minute and truncate, or reduced to a mere scarious ring. The central flower is commonly pedicellate and with an obsolete involucel, just as in *T. amplectens*, and the calyx, corolla, &c., so accord with that species, that, although the differences are constant so far as yet observed, it may confidently be inferred that one has been derived from the other.

In *T. microcephalum*, Pursh, well-developed heads show a receptacle bearing the flowers in three verticils.

ASTRAGALUS LENTIGINOSUS (Dougl., Gray, Rev. Astrag., p. 194), var. FLORIBUNDUS: subglaber; caulibus productioribus (pedalibus) adscendentibus e pleris axillis floriferis; pedunculis breviusculis spicato-plurifloris; floribus albis nunc apice purpureo tinctis; leguminibus junioribus rectis acutissime acuminatis glabris. — Nevada, near Carson City, Dr. C. L. Anderson. Flowers and legumes considerably smaller than those of the nearly allied *A. diphysus*, the teeth of the cylindraceous calyx shorter. The mature legumes in one specimen are somewhat mottled.

ASTRAGALUS ANDERSONII: undique pube mollissima subvillosa canescens; caulibus e radice perenni adsurgentibus (pedalibus) foliosis; stipulis discretis triangulari-lanceolatis; foliolis 7-12-jugis ovalibus oblongisve rarius obovatis; pedunculis folium superantibus; spica cylindrica vel oblonga densius multiflora; calycis dentibus setaceis tubo campanulato subæquilongo corolla cærulescente dimidio breviori; legumine oblongo-lineari (semi-sub-pollicari) chartaceo-coriaceo tomentuloso arcuatim incurvo subcompresso dorso sulcato septo ad suturam ventralem intruso bilocellato 12-20-spermo. — Near Carson City, Nevada, Dr. C. L. Anderson (1863 and 1864). A soft-downy and hoary species, not particularly related to any other North American species known to me, but with much the aspect of *A. chætodon* Torr.,* of the same region farther north. Leaflets 3 or 4 lines long. Flowers of about the same length, usually crowded in a spike of one or two inches in length (in fruit from 2 to 6 inches; the pedicels very short. Bracts setaceous, equalling the calyx tube. Corolla apparently ochroleucous tinged with blue or purple, becoming white or yellowish. Flowers more or less deflexed after anthesis. So are the pods, which curve upwards or are almost hamate when fully ripe. They are not at all stipitate. Seeds small.

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* *Vide* Gray, Rev. Astrag. p. 194. The specific name *chætodon* being preoccupied by Bunge, this may be named, in honor of the discoverer, the Rev. Mr. Spalding, *A. Spaldingii.*

ASTRAGALUS CYRTOIDES, Gray, Rev. Astrag., p. 201; forma magis pubescens; foliolis sæpius obovatis vel obcordatis, cum fructu;—nempe, legumine cartilagineo dorso haud intruso prorsus uniloculari sublineari utrinque acutato tereti e stipite pendente calycem longe superante sursum curvato hami- vel falciformi nunc demum annulari, suturis marginantibus angustis, ventrali acutissima. — Nevada, near Carson City, Dr. C. L. Anderson, who collected flowering specimens in 1863, and mature fruit in 1864, which enables me now to complete the account of this species. The fruit will be seen to accord with the *Podo-sclerocarpi*, but the habit and structure of the flowers show the nearest affinity with *A. racemosus*, Pursh, with which the species was associated in my revision of our *Astragali*. The legume is an inch or more in length, on a stipe nearly half an inch long; it is of a very firm cartilaginous texture, tomentulose, curved in the form of a pruning-hook or sickle, or at length even into a complete ring, the nerviform replum in old pods separable, that on the ventral side forming a narrow acute margin or edge.

ASTRAGALUS TENER, Gray, l. c., p. 206: forma foliis fere linearibus raro emarginatis; floribus læte violaceis. — Oakland, coll. Wm. Holder. Immature legumes more or less reflexed, half an inch long, lanceolate-linear, silky-puberulent, on a very short stipe which is hidden in the tube of the calyx, several-seeded, 2-locellate, the transverse section obcordate, the partition reaching to the ventral suture.

ASTRAGALUS INEPTUS: (*Oroboidei?*) cinereo-pubescens; caulibus e radice perenni diffusis ramosis (spithamæis et ultra); stipulis scariosis discretis; foliolis 6-9-jugis oblongis emarginatis supra fere glabris; racemis oblongis densifloris brevi-pedunculatis folio brevioribus; corolla alba vel ochroleuca apice pupurascente, ala rectiuscula; legumine immaturo ovato acuminato subincurvo puberulo membranaceo inflato haud stipitato polyspermo septo intruso fere bilocellato. — Dry, rocky mountain near Sonora Pass, alt. 9,000 feet. — A low, homely species, of which mature fruit is still a desideratum. The root apparently perennial. Leaflets 4 to 6 lines long, slightly fleshy, grayish underneath with a fine lax pubescence. Flowers half an inch long, on very short pedicels, narrow, the tips of the narrow wings and sometimes of the short keel tinged with purple. One or two forming legumes occur; they are scarcely above half an inch in length, thin-walled, and evidently inflated at maturity, moderately grooved at the dorsal suture,

the thin septum extending so as nearly or quite to touch the ventral suture.

Astragalus Whitneyi: (*Inflati,*) striguloso-puberulus; caulibus e radice perenni conferte ramosis spithamæis; stipulis brevibus adversus petiolum connatis; foliolis 5–9-jugis lineari-oblongis; pedunculis folium adæquantibus subcapitato-plurifloris; calycis dentibus triangulatis tubo campanulato quadruplo brevioribus; corolla læte purpurea, carina falcato-incurva alas adæquante vexillo paullo breviore; legumine pendente glaberrimo (maculoso) vesicario ovali subpollicari apice obtusissimo basi in stipitem e calyce leviter exsertem attenuato. — On the same mountain with the preceding species, in loose soil, near the summit, alt. 10,000 feet. — This species, which may appropriately bear the name of the distinguished Director of the California Geological Survey, would appear to be a near relative of the incompletely known *A. Hookerianus,* Gray, Astrag., l. c., p. 215; but the pubescence is strigulose, the stipules concreted and not scarious, and the pods very much smaller and glabrous. The young pods on the flowering specimens are not quite an inch long (including the short stipe): a loose one which seems as if full grown is not larger, and is mottled with purple. The flowers are half an inch long, and apparently blue or purple; in Dr. Brewer's notes upon the fresh plant, they are said to be "bright red-violet."

Astragalus platytropis: multiceps e rhizomatibus elongatis, nanus, vix caulescens, sericeo-argentatus; foliolis 3–5-jugis obovatis; pedunculis scapiformibus folium adæquantibus apice capitato-paucifloris; calycis dentibus subulatis tubo campanulato paullo brevioribus; corollæ (albæ seu lutescentis apice purpuratæ), carina dilatata recta apice hinc rotundata alas vexilloque æquilonga; legumine globoso-ovato membranaceo vesicario-inflato (vix pollicari) estipitato cinereo-puberulo polyspermo bilocellato, septo versus medium seminifero. — With the preceding species, in loose gravel and sand near the summit (alt. 10,000 feet). — Leaves and flowering stems or scapes rising only two or three inches above the soil. Stipules triangular or ovate, canescent. Leaflets 3 or 4 lines long. Flowers 5 or 6 in a small head, barely 4 lines in length; the broad keel tipped with purple; the rest of the corolla apparently white or yellowish. Forming legumes canescent, when older glabrate, scarcely grooved at the sutures; both sutures are septiferous, the funiculi being adnate to the ventral portion of the sep-

tum, in the manner of the *Diphysi*, — to which this remarkable species would belong by its fruit; but its habit is of the *Lotiflori*, and the short wings and standard are peculiar.

ASTRAGALUS PYCNOSTACHIUS: caule valido foliisque pube molli canescentibus; stipulis scariosis discretis; foliolis multijugis oblongis apice obtuso vel retuso mucronatis; pedunculis folium æquantibus; spicis etiam fructiferis densissimis oblongis vel cylindraceis; calycis pubescentis dentibus subulatis tubo brevi-campanulato brevioribus; corolla ut videtur pallida; leguminibus ovatis coriaceis glabris turgide lentiformibus stylo cuspidatis haud stipitatis calycem 2-3-plo excedentibus in spicam retrorsum congestis 1-3-spermis (ovulis 5), sutura neutra intrusa. — Baulinas Bay, in salt marshes within reach of tide, H. N. Bolander. — I have not seen the base of the stem: it must be more than a foot high, and rather stout. Leaflets 3 to 6 lines long, equally canescent-downy on both sides. Peduncles from all the upper axils, 2 or 3 inches long. The very compact spike an inch long in flower, 2 inches long in fruit. Flowers about 4 lines long, on very short pedicels: the corolla apparently white or ochroleucous. Legumes 4 or 5 lines long, the valves strongly convex, rather thin coriaceous, and with a few transverse veins; the sutures acute, the ventral one only prominent. The species would be arranged among the *Scytocarpi*; but it is quite different from any other North American *Astragalus*.

The following new triphyllous species, from a region east of the Rocky Mountains, may be added.

ASTRAGALUS TRIDACTYLICUS: (*Triphylli*,) habitu foliisque *A. triphylli* Pursh; floribus bis terve minoribus; calycis dentibus tubo æquilongis; corolla pallide purpurea; legumine globoso-ovoideo puberula calyce deciduo nudato; stipulis extus villosis. — Flores lin. 5 longi. Legumen lin. 3-4 longum, turgidissimum, 12-ovulatum. Semina matura 3-4, ratione leguminis magna. — Near Boulder City, Colorado Territory, in dense tufts or mats, on gravelly knolls, Dr. C. C. Parry, 1864.*

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* Dr. Parry's collection of 1864 contains the following other *Astragali* which deserve notice: —

ASTRAGALUS JUNCEUS, Gray, Rev., p. 230, with the teeth of the calyx in one specimen somewhat larger and sharper, so that this very rare species may pass into *A. diversifolius*.

ASTRAGALUS FENDLERI, Gray, just like the original, No. 157 of Fendler's collection, but probably passing into *A. flexuosus*.

ASTRAGALUS GLABRIUSCULUS, Gray (*Phaca*, Hook.), verging towards *A. aboriginum*, of which it is probably only a variety.

The genera *Horkelia*, Cham. & Schlecht., *Ivesia*, Torr. & Gray, and *Sibbaldia*, L., border so closely upon *Potentilla* that, for lack of absolute distinctions, they are not unlikely all to be referred to that already vast genus.* Such a combination, however, will hardly be thought satisfactory, even if unavoidable. The Linnæan genus, *Sibbaldia*, appears to have the least claims to its rank, having no peculiarity of habit, and comprising pinnate as well as trifoliolate species, which may well be regarded as Potentillas with the stamens, and in a less degree the carpels, reduced in number. If kept distinct, the deeply lateral styles will aid in separating *Sibbaldia* from the following.

Horkelia, however, if strictly limited, is pretty well marked in habit, and decidedly so in technical characters. These are the campanulate calyx and the (10) dilated filaments. This last and most distinguishing feature was omitted from the original generic character, and also from that of Endlicher.

Ivesia (striking out *I. gracilis*) I think should also be kept distinct from *Potentilla*, and probably from *Horkelia*. It cannot fail to be retained as a genus, if *Sibbaldia* is. There are now several species, all with the same peculiarity of foliage, which is quite unlike anything in *Potentilla*. Its characters are the campanulate or cyathiform calyx, the definite (5 to 20) stamens with slender filaments, and the few, in one instance even solitary, carpels.

In thus arranging these plants, it will be seen that there is one ambiguous and very troublesome species, viz. *Horkelia tridentata*, Torr., which, with the calyx and nearly the habit of *Horkelia*, has slender filaments. They are not, however, filiform, nor inserted, with the petals, at the bottom of the calyx, as represented in the plate. They are short, and inserted in the throat of the calyx, as in *Horkelia*, from which they differ only in being subulate. My specimen is insufficient.

HORKELIA, Cham. & Schlecht.

Calyx campanulatus, 10-fidus. Petala unguiculata seu spathulata (alba vel rosea). Stamina 10, fauci calycis inserta: filamenta brevia, dilatata, plerumque deltoidea petaloidea persistentia. Carpella plurima, nunc pauciuscula, in receptaculo villoso parvo elevato insidentia:

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* This has been done in the yet unpublished second part of Bentham and Hooker's Genera Plantarum.

stylus cum ovarii apice articulatus. — Pinnatifoliæ, plurifoliolatæ; foliolis subsparsis sæpius incisis vel partitis, superioribus confluentibus.

§ 1. Genuinæ.

* Foliolis subrotundis cuneatisve dentatis incisisque.

+ Calycis segmentis accessoriis vera adæquantes vel iis subconformia. Cymæ subfolioso-bracteatæ, floribus alaribus longius pedicellatis.

1. HORKELIA CALIFORNICA, Cham. & Schlecht. *H. grandis*, Hook. & Arn. *H. capitata*, Torr. Bot. Whipp., non Lindl. — California. Accessory calyx-lobes, or some of them, only occasionally bifid at the apex or toothed. In one specimen, from Los Angeles, Wallace, in a single flower only, there is a broadly subulate sterile filament, longer than the fertile ones, between each petal and its anteposed stamen!

Var. β. CUNEATA. *H. cuneata*, Lindl., I cannot distinguish as more than a smaller variety of Chamisso's species, with accessory calyx-lobes more conformed to the true ones, leaflets smaller, more cuneate, &c.

Var. γ. SERICEA: pube molli sericea subcanescens. — Oakland, near San Francisco.

++ Calycis segmentis accessoriis quam vera multo minoribus.

2. HORKELIA PARVIFLORA, Nutt. Oregon, Nuttall. Nevada, Dr. Newberry, Dr. C. L. Anderson.

3. HORKELIA CAPITATA, Lindl. Oregon, Douglas.

* * Foliolis angustis lobatis seu profunde incisis, laciniis lobisve linearibus; stipulis laciniatis vel pectinatis. Calycis segmentis accessoriis linearibus vel subulatis. Cymæ demum perfectæ multifloræ.

4. HORKELIA FUSCA, Lindl. Subviscoso-pubescens; foliis demum glabratis; petalis anguste cuneatis obcordatis. — Oregon, Douglas.

5. HORKELIA CONGESTA, Hook. *H. hirsuta*, Lindl. Villoso-barbata, superne denudata; petalis late obovatis vel rotundatis ungue angusto. S. Oregon, Douglas, Nuttall. N. California, Newberry.

6. HORKELIA TENUILOBA. *H. fusca* var. *tenuiloba*, Torr. Bot. Whipp. Pacif. R. R. Surv. 4, p. 84. Villoso-canescens; foliolis brevibus (lin. 3 – 4 longis) ambitu cuneatis profunde palmato-4 – 8-partitis, sinu medio sæpe profundiori, lobis linearibus; calycis segmentis accessoriis linearibus vera lanceolata subæquantibus; petalis anguste oblongo-spathulatis emarginatis; filamentis lanceolatis. — Santa Rosa

Creek, California, Dr. J. M. Bigelow. — Pubescence more like that of *H. congesta*, but softer, shorter, and less shaggy. Flowers small; petals 3 lines long, narrow, not unguiculate.

§ 2. Ambiguæ (an *Ivesia?*) ; filamentis subulatis.

7. Horkelia tridentata, Torr. Bot. Whipp. l. c., t. 6. California, Dr. J. M. Bigelow.

IVESIA, Torr. & Gray, pro parte.

Calyx campanulatus vel basi cyathiformis, 10-fidus. Stamina definita (5, 10, 15, 20) : filamenta gracilia (tenuiter subulata vel filiformia). Carpella pauca, quandoque solitaria, in receptaculo parvo villoso: stylus subterminalis. — Pinnatifoliæ, millefoliolatæ, foliolis parvis palmati- seu pedatipartitis creberrimis nunc quasi-verticillatis vel rhachin undique imbricantibus, petalis late obovatis vix unguiculatis post anthesin spathulatis.

* Flavifloræ, 5-10-andræ, glabellæ; foliis plerisque radicalibus; scapo apice congestifloro.

1. Ivesia Gordoni, Torr. & Gray in Newberry, Rep. Pacif. R. R. Exped. 6, p. 72. (*Horkelia Gordoni*, Hook. Kew Jour. Bot. 5. p. 341, t. 12. *H. millefoliata*, Torr. in Sitgreaves Zuni Exped.) Spithamæa e caudice crasso, viscido-pubens vel glabrata; foliolis confertis 5-9-partitis, segmentis obovato-spathulatis obtusis; cyma capitata pluriflora; calycis mox turbinati lobis ovatis demum triangularibus quam accessorii oblongi demum sublineares longioribus ; staminibus 5 ; receptaculo longe villoso ; carpellis 10 - 14. — Besides the New Mexican habitats, we have what appears to be a dwarfer and alpine form (from which the above character is mainly drawn) of the same species, collected by Professor Brewer in the Sierra Nevada, at Ebbett's and Sonora Pass, near Soda Springs, &c., at the altitude of 8,700 to 10,800 feet; in flower and with young fruit. The fruiting specimens are very well represented by Hooker's figure. The golden-yellow petals, at first almost orbicular, become spatulate or even oblanceolate after anthesis, and then shorter than the accrescent calyx-lobes, as delineated and described by Hooker. Stamens only 5, alternate with the petals.

2. Ivesia lycopodioides, sp. nov. Nana (sesqui-tripollicaris), fere glabra; foliis in caudice crasso cæspitoso-confertis, pinnis quasi verticillatis creberrimis, foliolis minimis 5-7-sectis, segmentis obovato-rotundis crassiusculis rhachin undique imbricantibus; scapo capitato-

3 – 5-floro; staminibus 5; receptaculo longe villoso; carpellis 5 – 10. — High alpine region of the Sierra Nevada, on Mount Dana, alt. 11,000 to 12,000 feet. (Also Bear Mountain, Mariposa, Miss Errington, ex Torr.) Leaves only an inch long; the leaflets and their divisions less than a line in length, nearly sessile, so crowded on the rhachis and imbricated that the leaves may be likened to the shoots of a minute tufted *Lycopodium*. Flowers like those of the preceding species, except in size, only a quarter of an inch in diameter. Fruit not seen.

3. IVESIA PYGMÆA, sp. nov. Habitu præcedentis, sed minutim glandulosa; foliolis minus confertis, segmentis oblongis setam nunc setulas 2 – 3 accessorias gerentibus; bracteis calycibusque parce hirsutis; staminibus 10; receptaculo breviter piloso; carpellis circiter 7. — Among rocks in the Sierra Nevada, from 11,000 feet (where it abounds) up to 12,000 feet; Prof. Brewer, coll. 1864. — This, more than the last, resembles *I. Gordoni* on a diminished scale; and it is possible that all three may run together. This, however, in the specimens, is distinguished by some hairiness, especially on the calyx, by the bristle which conspicuously tips each little leaflet or segment, by the less villous receptacle, and by the 10 geminate stamens.

* * Albifloræ, 15 – 20-andræ; caulibus gracilibus magis foliatis; cyma paniculata; foliis albido-lanatis myosuroideis; filamentis gracillimis.

4. IVESIA PICKERINGII, Torr. in Bot. Wilkes Pacif. Exped. (Calif. & Oregon), t. 4. Pedalis; foliis primum myosuroideis, foliolis demum patentiusculis 3 – 5-partitis sectisve, segmentis oblongis; pedicellis calyce (fructifero obconico-campanulato) brevioribus; lobis accessoriis calycis ovato-lanceolatis; staminibus 20 manifeste triseriatis; antheris mucronulatis; carpellis 4 – 6. — Coll. by Dr. Pickering, &c., on the journey from Oregon to California, probably on the Sacramento. (Character from a fragment, and from the plate cited.)

5. IVESIA SANTOLINOIDES, sp. nov. Spithamæa; foliis myosuroideis; foliolis minimis 3 – 5-sectis (segmentis ovalibus obtusis) appressis rhachin arctissime imbricantibus; pedicellis primariis elongatis filiformibus; floribus parvis; calycis tubo cyathiformi lobis propriis dimidio brevioribus, lobis accessoriis parvis ovatis; staminibus 10? – 15; antheris didymis haud apiculatis; carpello unico in fundo calycis sub lana occulto. — In the Sierra Nevada. This is to *I. Pickeringii*, what *I. lycopodioides* is to *I. Gordoni*: its myriad minute leaflets or segments

(barely half a line in length) most closely imbricated all around the rhachis, so that the leaf ($1\frac{1}{2}$ to 2 inches long) resembles a mouse-tail, when young clothed with soft silky down, which conceals the parts beneath. When old the leaflets are more apparent, but they seem to remain permanently imbricated. Flowers, when expanded, scarcely 3 lines in diameter; the petals exceeding the calyx, roundish-flabelliform, and scarcely at all unguiculate, becoming obovate after anthesis. Fruit not seen.

Ivesia gracilis, Torr. & Gray, in Newberry, Rep. l. c., t. 11, = *Potentilla Newberryi*, Gray.

EPILOBIUM OBCORDATUM: nanum, glabrum; caulibus (3–5-pollicaribus) decumbentibus 1–5-floris; foliis oppositis lato-ovatis ovalibusque subintegerrimis opacis glaucescentibus; alabastris nutantibus; calycis tubo ultra ovarium pruinoso-puberulum producto infundibuliformi lobis lato-lanceolatis subdimidio breviore; petalis magnis læte roseis obcordato-bilobis patentibus; stylo stamina superante declinato; stigmate breviter quadrilobo; capsulis pedicellatis clavato-oblongis. — In the Sierra Nevada, at Squaw Valley and Ebbett's Passes, alt. 8,000 - 8,500 feet. — A charming alpine species, connecting the *Chamænerion* with the other sections of the genus, and with large and showy flowers, having the aspect of an *Œnothera* or a *Clarkia.* The leaves are numerous, mostly longer than the internodes, closely sessile, and only from one third to two thirds of an inch in length. [Also found recently by Dr. Torrey.]

EUCHARIDIUM BREWERI: foliis oblongo-lanceolatis; petalis latissime cuneato-obcordatis cum lobo intermedio lateralibus longiori valde angustiori; filamentis apice eximie clavatis; antheris villoso-ciliatis; stigmate 2–4-partito (sæpius bipartito segmentis elongatis bilobis); capsula elongata (ultrapollicari); seminibus magis alatis. — Dry summit of Mount Oso, at the elevation of about 3,200 feet. — This would be a fine acquisition to the gardens, as the flowers are larger and fuller than those of *E. concinnum*, the petals fully three fourths of an inch wide, very broadly cuneiform-obcordate with a narrow linear-spatulate median lobe (not exceeding two lines in width) in the deep sinus. The filaments, also, instead of being filiform, are conspicuously dilated at the summit, where they are broader than the linear anther, apparently clavate rather than petaloid. The villosity of the anthers, which is here very striking, is found sparingly in *E. concinnum.*

MITELLA (MITELLARIA, licet stam. petalis altern.) BREWERI: foliis omnibus radicalibus rotundato-remiformibus incise duplicato-crenatis brevi-petiolatis; scapo (spithamæo) nudo; calyce explanato 5-undulato; staminibus 5 petalis pectinato-pinnatifidis alternis. — Mount Hoffmann, in a damp place, at the elevation of about 11,000 feet. The outline and crenation of the leaves and the short (shaggy-hirsute) petioles distinguish this at a glance from *M. pentandra*, with which it accords in the structure of the flower, in the two two-lobed sessile stigmas, &c.; but here the very short filaments are inserted before the calyx-lobes, instead of before the petals. This is all that was needed thoroughly to suppress *Drummondia* of De Candolle (*Mitellopsis*, Meisn.).

SAXIFRAGA BRYOPHORA: *Arabidia*, *S. stellari* et *leucanthemifoliæ* proxima; foliis abbreviatis oblanceolatis lineari-oblongisve aveniis integerrimis ciliatis sessilibus sæpissime rosulatis; scapis aphyllis paniculato-ramosis, ramis elongatis flore unico perfecto terminatis, pedicellis lateralibus plurimis racemosis filiformibus mox refractis proles gemmiformes (flores mutatos) gerentibus; sepalis lato-ovatis; petalis lanceolato-ovatis basi abruptis bimaculatis; stylis vix ullis. — Ebbett's Pass, and on a peak near Mount Dana, alt. 9,000 feet, on wet rocks. — Leaves half an inch or less than an inch long. Scapes a span high, usually with divergent branches; the fertile and gemmiferous pedicels half an inch or less in length; some of the gemmæ are mere altered flower-buds; others are rosulate tufts from which a shoot is proceeding. This bears much the same relation to *S. leucanthemifolia* that *S. stellaris* var. *comosa* does to ordinary *S. stellaris*. But the small and quite entire leaves, and the reflexed filiform pedicels of the gemmæ are peculiar.

Some new materials and observations make it desirable to revise the genus.

LITHOPHRAGMA, Nutt., Torr., & Gray.

* Petala lamina tripartita, segmentis angustis: folia omnia partita vel infima lobata: radix (quandoque caulis) bulbillifera.

1. LITHOPHRAGMA GLABRA, Nutt. Glabella; racemo axillisque foliorum sæpe bulbilliferis; pedicellis calyce campanulato pubero longioribus; ovario basi tantum calyce adnato; seminibus muriculatis. — Blue Mountains of Oregon, Nuttall. Pine forests on small tributaries of the Upper Sacramento, California, Fremont. Rocky Mountains in Colorado Territory, mixed with *Saxifraga cernua*, Hall and Har-

bour.— It must have been through some mistake that, in the Flora of North America, this species was placed in the section with an adherent ovary.

2. LITHOPHRAGMA TENELLA, Nutt. Glanduloso-hirsutula; foliis minus dissectis; pedicellis calyce primum obconico dein campanulato æquilongis; ovario infra medium adnato; seminibus lævibus.— Rocky Mountains. The only specimens are the original, scanty, and apparently depauperate ones of Nuttall. The plant resembles a diminutive *L. parviflora*, with less divided leaves, and a campanulate calyx, the base of which is certainly adnate to the lower part of the ovary. The seeds are much smaller and oval.

3. LITHOPHRAGMA PARVIFLORA, Nutt. (*Tellima parviflora*, Hook. Fl. Bor.-Am. 1. p. 239, t. 78.) Scabro-hirta; pedicellis suberectis calyce obconico (fructifero nunc clavato) creberrime glanduloso-hirtello sæpius brevioribus; ovario ultra medium adnato; seminibus lævibus oblongis.— Rocky Mountains and Oregon, to Vancouver's Sound.

The plant referred to this species in Ives's Colorado Expedition, collected by Dr. Newberry on hills along Cedar Creek, in the western part of New Mexico, is, from the calyx, &c., more like *L. tenella* on a larger scale, but probably is of a different species, not to be made out satisfactorily with the extant materials. It bears some granules or bulblets on the base of the stem, which have not been detected in any of the following species.

* * Petala lamina dilatata triloba, raro integra: folia radiculia reniformi-rotundata subindivisa vel crenato-lobata, superiora 3–5-fida vel partita: bulbilli ad radices, etc., nulli. Flores majusculi.

4. LITHOPHRAGMA AFFINIS, sp. nov. Scabro-hirta, 1–1½-pedalis; floribus modice pedicellatis; calycis creberrime glanduloso-hirtelli tubo turbinato ad apicem fere ovarii adnato; stylis granulosis; petalis maxime dilatatis apice trilobis; seminibus lævibus.— This has been confounded with *L. heterophylla*, and it is apparently as common in California around and north of San Francisco, where Dr. Brewer has abundantly gathered it, at several stations. To it belongs the specimens (named *L. heterophylla*) collected by Dr. Bigelow in Whipple's Expedition, a part of Dr. Parry's, collected at Monterey, in the Mexican Boundary Survey, Thurber's from Napa County, and specimens from Ross, long ago distributed by the St. Petersburg Academy. It is at once distinguished from the next by the calyx tapering to an

acute base, and the ovary almost wholly inferior. It is commonly a larger plant; the petals are from one third to nearly half an inch in length, their middle lobe occasionally laciniate-toothed. The pedicels are usually about the length of the fruiting calyx.

5. L. HETEROPHYLLA, Hook. & Arn. sub *Tellima*. Scabro-hirta, subpedalis; pedicellis brevissimis; calyce lato-campanulato minus hirto, fructifero basi quasi truncato; ovario libero stylisque glabris; petalis trilobis; seminibus muriculatis. — California, common near the coast, and northward. — The difference in the seeds (which are smaller and rounder as well as muriculate) may assure us that the case of this and the foregoing is not one of dimorphism. There appears also to be a slight difference in the anthers.

6. LITHOPHRAGMA BOLANDERI, sp. nov. Major (1–2-pedalis, foliis sæpe 1–2-poll. latis), hirsutulo-scabrida; racemo elongato plurifloro; pedicellis brevissimis seu calyce lato-campanulato (fructifero basi quasi truncato) dimidio brevioribus; ovario ima basi excepta libero; petalis nunc integerrimis nunc leviter trilobatis vel dente utrinque instructis; seminibus muricatulo-scabridis. — California, in a shady ravine, S. E. of Monte Diablo (Dr. Brewer), and farther north in the Mendocino district, H. N. Bolander. — The largest species: petals white, 3 or 4 lines long, more commonly all entire, sometimes all but one of the flowers more or less toothed or even lobed. Styles, as in the next, very short and glabrous. A slender form, in herb. Torrey, was collected in the valley of the Sacramento by Dr. Stillman.

7. LITHOPHRAGMA CYMBALARIA, Torr. & Gray (*Saxifraga Californica*, Nutt. mss.). Exilis, glabella; caule scapiformi (6–14-pollicari, foliis ⅓–⅔-poll. diam.) 4–7-floro; pedicellis calyce campanulato-cyathiformi (basi acuto) longioribus; ovario basi adnato; petalis spathulatis oblongisve integerrimis; seminibus muricatulo-scabridis. — Near Santa Barbara, Nuttall, Parry, Brewer, in cañons. Cauline leaves sometimes a pair and opposite or nearly so, sometimes alternate, occasionally almost obsolete. Lobes of the calyx *much shorter* than the tube except in Nuttall's very depauperate specimen. Petals, in good flowers, 3 or 4 lines long.

CYMOPTERUS CINERARIUS: parvus; caudice repente; petiolis basi scarioso-dilatatis sursum scapisque gracilibus (1–3-pollicaribus) glaberrimis; folio decomposito ambitu subcordato glauco-cinereo pruinoso-puberulo, segmentis lobisque confertissimis; umbellulis 1–4 (sæpe solitariis) capitatis involucellum completum multifidum (lobis ex ovato subulatis) subsuperantibus; floribus albidis roseisque; calycis dentibus parvis obtusis; fructibus 10-alatis, alis suberoso-scariosis maxime undulatis; semine ventre intus profunde excavato. — In volcanic ashes, on dry hills in the high Sierra Nevada, at Sonora Pass, and above Lake Mono, alt. 9 – 10,000 feet. Leaves and scapes emerging from a subterranean creeping rhizoma; the lamina of the former mostly less than an inch in diameter, the divisions extremely crowded, the ultimate lobes a line or rarely two lines long, oblong, obtuse, mucronate. Scape commonly exceeding the leaves. Involucel nearly herbaceous. Pedicels extremely short. Fruit 3 lines long, with complete, rather broad, white (or purplish-tinged) and much undulate wings: vittæ 3 in each interval and a few on the commissure. Seed deeply excavated at the commissure, the cross-section strongly reniform, more so than in *C. montanus*, &c. (noticed in Pl. Fendlerianæ, p. 57); so that the fruit is decidedly campylospermous.

CYMOPTERUS FŒNICULACEUS, Nutt., as I suppose it to be, also collected by Dr. Brewer in the Sierra Nevada, is almost equally campylospermous. It is hoped that the primary divisions in this order may yet be established upon other characters than the form of the seed.

CYMOPTERUS? NEVADENSIS: depresso-cæspitosus, glaucus, fere glaber; petiolis brevibus, basibus scarioso-dilatatis caudices breves vestientibus; lamina foliorum 3 – 7-partita, segmentis rigidis lato-lanceolatis cuspidatis, lateralibus raro 2 – 3-fidis; scapo ($\frac{1}{6}$ – $\frac{1}{2}$-pollicari) folia parum superante umbellam capitatam quasi simplicem gerente; involucellis 4 – 5 lateralibus 3-fidis flores (flavidos?) adæquantibus involucrum simulantibus. — At and near the summit of Mount Dana, one of the highest peaks in the Sierra Nevada, alt. 13,227 feet. In flower only, the genus quite uncertain. Plant only an inch or two in height, tufted. Leaves and scapes obscurely puberulent. Umbel 3 or 4 lines in diameter, composed of 3 to 5 subsessile umbellets, each adnate to the base of a foliaceous 3 – 5-cleft involucel (the divisions ovate); these involucels imitating a complete common involucre. Pedicels scarcely any. Ovary showing obscure rudiments of wings. Calyx-teeth lanceolate-subulate. Styles long and slender.

SPHENOSCIADIUM, nov. gen. *Angelicearum.*

Calycis margo obsoletus. Petala spathulato-obcordata, cum lacinula setaceo-acuminata inflexa. Styli filiformes. Fructus cuneatus: mericarpia compressa sursum sensim quinquealata; alis suberosis, marginalibus latioribus; valleculis univittatis; commissura bivittata. Carpophorum bipartitum. Semen more *Cymopteri* sectione transvera planiusculo-lunata. — Herba Californica; radice fusiformi; caule valido fistuloso usque ad umbellas cum foliis sub-bipinnatisectis glabro; umbellis tomentosis exinvolucratis; involucellis multipartitis flores albos sessiles densissime capitatos subæquantibus.

SPHENOSCIADIUM CAPITELLATUM. — In the Sierra Nevada, near Ebbett's Pass, alt. 7 – 8,000 feet, by a stream; in flower. Nevada, near Carson City, Dr. C. L. Anderson; with fruit. Root rather strong-scented, acrid. Stem 2 to 5 feet high, striate. Petioles spathaceous-dilated. Divisions of the leaves ovate- or oblong-lanceolate, about an inch long, coarsely and sharply few-toothed or incised; veinlets finely reticulated. Umbel 7 – 10-radiate; the umbellets are globose heads, 4 or 5 lines in diameter, in fruit about three fourths of an inch; the flowers (pubescent) sessile on a dilated receptacle, to which the short involucel is somewhat adnate. Fruits 3 lines long, pubescent; the mericarps (including the wings) obovate-cuneate or obscurely obcordate; the narrow base strongly 5-ribbed; but the corky ribs enlarge towards or at the summit into thickish wings, the lateral ones being the broadest, sometimes nearly as broad as the seed. A thick vitta in each interval, and two submarginal ones on the commissure.

LONICERA (XYLOSTEON) BREWERI: caule erecto; foliis ovalibus vel obovatis pubescentibus breviter petiolatis; pedunculis folio sublongioribus; ovariis urceolato-oblongis basi coadnuatis; bracteolis minimis; corolla lurido-purpurea campanulata late gibbosa ultra medium bilabiata; fauce styloque hirsutissimis. — In a ravine of the Sierra Nevada, near Mount Dana, at the elevation of about 10,000 feet. — Allied to *L. nigra* of the Old World; but the leaves (only an inch or less in length) rounder, much more pubescent, and of a different venation; the ovaries narrower, and crowned with subulate calyx-teeth, the corolla more gibbous, the style hirsute, &c.

GALIUM ANDREWSII: pulvinato-cæspitosum; rhizomatibus longis filiformibus; foliis crebris quaternis subulatis setuloso-apiculatis rigidis nitidulis glabris aut fere nudis aut cum angulis caulium pl. m. spinuloso-ciliatis, costa valida; pedunculis 1 – 3-floris nudis; floribus albidis; fructu lævi. — Var. *a.* gracilius; foliis lineari- vel aciculari-subulatis margine aut parce aut rarissime spinuliferis: pedunculis folia adæquantibus. — β. compacte pulvinatum; pedunculis brevissimis unifloris, foliis subulatis creberrimis. — γ. compactum; pedunculis foliis brevioribus 1 – 3-floris; foliis latioribus lanceolato-subulatis ad margines angulosque acutissimos caulium crebrius spinuliferis. — California, Dr. Andrews, Mr. Shelton (Herb. Torrey). Near Fort Tejon, Dr. Horn, Dry Hills, Atascadero (var. α), and Santa Inez Mountains near Santa Barbara (var. β), near Kirka Pass (var. α), and near Monterey? (var. γ), Dr. Brewer. — The laxer forms have the aspect of *G. orientale*, the more condensed, of *G. Pyrenaicum* and *G. Cyllenium*, Boiss.; and the species is very different from any other North American one. The Chilian *G. hypnoides*, Clos, is similar, but its leaves are nearly destitute of costa, and it is said to have a distinct limb to the calyx. The fruit apparently dry; no involucre or whorl of bracts on the peduncle. Plants from two inches to a span high.

GALIUM BLOOMERI: glaberrimum, inerme, erecto-diffusum; foliis quaternis ovatis cuspidato-acuminatis subtrinerviis opacis, floralibus sæpe tantum oppositis; floribus abortu dioicis, masculis cymulosis brevipedunculatis, fœmineis subsolitaris subsessilibus; corolla ut videtur ochroleuca; fructu (juvenili) hirsutissimo. — Nevada Territory, near Virginia City, Mr. H. G. Bloomer, to whom, as its discoverer, and an ardent devotee to Botany, I have much pleasure in dedicating this very well-marked species. The specimens are a foot or less in height, from a perennial or suffrutescent base. Stems paniculately branched. Leaves 3 to 5 lines long, closely sessile, rather rigid, veinless, the midrib evident, the larger leaves with a pair of lateral ribs, which vanish near the middle. Corolla a line and a half in diameter. The nature of the verticil is well shown in some of the floral leaves, which are reduced to a pair, sometimes slightly connate by a transverse membranous line, and sometimes with a smaller bifid or bidentate leaf interposed on each side, this evidently answering to a connate pair of stipules.

GALIUM HYPOTRICHIUM: humile, pube minuta cinerea scabridum, inerme; foliis quaternis ovatis apiculatis subtrinerviis, floralibus oppositis; floribus submonoicis vel hermaphroditis parce cymulosis; pedicellis flore longioribus post anthesin recurvis; fructu (juvenili) juxta basin setis longis crinito, cæterum lævi. — Sonora Pass, in the Sierra Nevada, alt. 8,000 to 9,000 feet, in dry and rocky places. — A span high, apparently tufted, in habit, foliage, &c., much resembling the preceding species; the flowers smaller, apparently white or yellowish. The bristly hairs on the forming fruit are rather few, much longer than the ovary, and all confined to its base. The floral leaves, in simple pairs, often show minute interposed stipules.

KELLOGIA GALIOIDES, Torr. in Bot. S. Pacif. Ex. Exped. coll. N. W. Amer. Phænog. t. 4. — This interesting plant, which, we believe, was discovered in the northern part of California, has now been collected by Dr. Brewer [and more recently by Dr. Torrey himself], in the foot-hills of the Sierra. It is, as it were, an *Asperula* with opposite leaves and scarious interposed stipules.

MACHÆRANTHERA (HESPERASTRUM; ligulæ steriles) SHASTENSIS: nana, e caudice perenni multicaulis, tomentuloso-canescens; caulibus 1 – 2-cephalis; foliis integerrimis obtusis, inferioribus spathulatis subtrinervatis, superioribus oblongis subamplexantibus; involucri campanulati squamis lanceolato-linearibus sæpius acutis, extimis apice herbaceis, interioribus tenuioribus inappendiculatis; ligulis "roseo-violaceis"? — Northern California, on Mount Shasta, at the height of 9,000 feet. Very little of this was found. It is a dwarf alpine plant (3 to 6 inches high, the lower leaves less than an inch long, the upper cauline successively smaller), with the aspect, styles, and generally the character of *Machæranthera*, except the perennial root and completely neutral rays, or of *Aster*, excepting the last-named particular. As it has neither the peculiar appendages to the style nor to the anthers of *Lessingia* and *Corethrogyne*, I cannot refer it to the latter genus, but on the whole conclude to append it to *Machæranthera*. The ovaries are scarcely compressed. Involucre 3 or 4 lines in diameter.

ASTER BLOOMERI: depressus, cæspitoso-diffusus; ramis foliosis apice monocephalis; foliis parvis (3 – 6 lin. longis) oblongo-linearibus imisve lineari-spathulatis sessilibus uninerviis aveniis hispidulo-scabris et ciliolatis; involucri hemisphærici squamis subtriserialibus lineari-lanceolatis acuminatis dorso vel apice herbaceis minute granuloso-glandulosis laxiusculis; ligulis pallide violaceis? — On high slopes of Mount Davidson, near Virginia City, Nevada, H. G. Bloomer. A peculiar little species, to be ranked, perhaps, with the *Ericoidei*, but not obviously related to any other. Stems tufted from a somewhat ligneous caudex, the branches very leafy nearly to the heads; the leaves uniform. Heads about 4 lines in diameter, exclusive of the rays. Appendages of the style subulate. Achenia pubescent. Pappus soft.

Erigeron (Celmisia) Andersonii: lana tenui arachnoidea mox decidua glabratum; caulibus e rhizomate nudo adsurgente erectis simplicissimis apice nudo monocephalis; foliis coriaceis linearibus acutis, radicalibus elongatis (spithamæis) 3–5-nerviis deorsum attenuatis, caulinis brevibus basi latioribus in bracteas subulatas decrescentibus; capitulo hemisphærico majusculo ($\frac{2}{3}$-pollicari); involucri lanulosi squamis lineari-lanceolatis subherbaceis parum biseriatis; ligulis uniseriatis exsertis lato-linearibus (cæruleis vel purpureis); styli ramis fl. herm. filiformibus, parte hispida quam stigmatosa 3–4-plo longiori; acheniis oblongo-linearibus villosis 4–6-costatis; pappo uniseriali, setis æqualibus barbellulatis. — Nevada, near Carson City, Dr. C. L. Anderson. Lake Tenaya in the Sierra Nevada, Prof. Brewer, a single depauperate specimen. Stems a span to a foot high: the rigid leaves soon glabrous. Bristles of the pappus all alike, but with a few minute setulæ intermixed, as in most Erigerons. This is a North American representative of the Andine group of species, sometimes referred to *Aster*, which Schultz has recognized as identical with *Celmisia*, and Weddell has referred to *Erigeron*. I am constrained by the uniserial pappus, etc., to adopt the same view, rather than to refer this plant to *Aster*. But the long and filiform appendages of the style (resembling those of some of its South American relatives) are most unlike those of the true Erigerons. The several species of *Celmisia* differ greatly in the form of the style.

Erigeron concinnum, Torr. & Gray, var. **aphanactis**, ligulis abortivis stylo brevioribus eradiatum. — Near Carson City, Nevada, Dr. C. L. Anderson. Virginia City, H. G. Bloomer.

Erigeron Bloomeri; nanum, multiceps e radice fusiformi; foliis plerisque radicalibus confertis fere filiformibus cum scapis monocephalis pube minuta appressa cinereis; involucro lanato-villoso, squamis subæqualibus disco parum brevioribus; ligulis plane nullis; acheniis plano-compressis hirsutulis; pappo simplicissimo. — Nevada, near Virginia City, H. G. Bloomer; near Carson City, Dr. C. L. Anderson. Scapes about three inches high, twice the length of the leaves, naked above, 2–3-leaved towards the base. Heads about twice the size of those of *E. filifolium*, the involucre clothed with copious white and soft hairs. Pappus a little shorter than the tubular corollas. Achenia flat, with a nerve only on each margin. Appendages of the style short and acute.

ERIGERON BREWERI : *Pseuderigeron*, pube minuta cinereum ; caulibus e rhizomate tenui repente adsurgentibus gracilibus usque ad apicem corymboso-1 – 5-cephalum foliosis ; foliis oblanceolatis seu lineari-spathulatis uninerviis integerrimis ; pedunculis brevibus ; involucro fere glabro disco maturo dimidio brevioribus, squamis 2 – 3-seriatis inæqualibus ; ligulis elongatis uniserialibus (ut videtur violaceis) ; acheniis parce hirtellis ; pappo duplici, exteriore brevi setuloso. — Yosemite Valley, alt. 4,000 feet ; in flower. Near Carson City, Nevada, Dr. C. L. Anderson ; in fruit. Stems mostly simple from the base, a span to a foot high. Leaves an inch or less in length, mostly narrow-spatulate and obtuse. Heads smaller than those of *E. foliosum*, Nutt. (*E. Douglasii*, Torr. & Gray) ; the involucre more imbricated, as in *E. Bigelovii*, but decidedly shorter. Pappus as long as the disk-corolla. Appendages of the style very short and obtuse. Achenia linear, flat, 2-nerved.

LINOSYRIS (CHRYSOTHAMNUS) HOWARDII, Parry, in litt.: fruticosa, semi – sesquipedalis ; ramis junioribus lanoso-dealbatis ; foliis linearibus acutatis uninerviis glabratis (primum tenuiter arachnoideis), floralibus capitula corymboso-congesta superantibus vel subæquantibus ; involucro 5-floro cylindraceo, squamis laxiusculis lanceolatis omnibus modo *L. Parryi* attenuato-acuminatis ; corollæ pallide flavæ tubo parce villosulo ; acheniis linearibus pubescentibus. Var. *α*. foliis angustissime linearibus elongatis ; involucro tenuissime arachnoideo glabrato. — Colorado Territory, on gravelly hills near "Hot Springs" of Middle Park, where it is often associated with *L. Parryi*, Gray, coll. C. C. Parry, 1863. It is more shrubby than that species, its smaller and fewer-flowered heads in terminal, fastigiate, almost capitate clusters, &c. A little of it was included under Hall and Harbour's No. 293.

Var. *β*. NEVADENSIS : foliis pl. m. latioribus brevioribus (inferioribus subspathulato-linearibus), apice cuspidato sæpius incurvo ; involucri squamis præsertim ad margines magis arachnoideis subviscosis. — Mount Davidson, Nevada, above Virginia City, H. G. Bloomer. Near Carson City, Dr. C. L. Anderson. Ebbett's Pass, within the borders of California, alt. 9,000 feet, Prof. Brewer ; a dwarf form, only 5 or 6 inches high.

APLOPAPPUS BLOOMERI : suffruticosus, pedalis, subresinosus, glaber ; ramis fastigiatis usque ad apicem foliosis corymboso- (vel subpaniculato-) polycephalis ; foliis subspathulato-linearibus basi attenuatis rigidis uninerviis vel inferne obsolete trinerviis; capitulis folioso-bracteatis; involucro subturbinato 3-4-seriali, squamis coriaceis lanceolatis pl. m. resinosis et villoso-ciliatis, exterioribus folioso- vel subulato-caudatis, intimis tenuioribus inappendiculatis; floribus radii 3-4 ligula oblonga exserta, disci 15-20; acheniis linearibus pubescentibus. — On Mount Davidson, Nevada, H. G. Bloomer. Near Carson City, Dr. C. L. Anderson, with a very narrow-leaved and more loosely corymbose-headed form. Leaves from one to barely 2 inches long. Heads crowded, about half an inch long; and the ligules 4 or 5 lines long. Anthers and style exserted; the short branches of the latter bearing long subulate-filiform appendages, as in *Linosyris* section *Chrysothamnus*, *Aplopappus* section *Ericameria*, and in the following species, to which it is nearly related.

APLOPAPPUS SUFFRUTICOSUS (*Macronema suffruticosa*, Nutt.): spithamæus e basi depresso-ramosa lignosa, glanduloso-puberulus, subviscidus; ramis usque ad apicem foliosis sæpissime monocephalis; foliis linearibus seu lineari-subspathulatis acutatis uninerviis; involucro folioso-bracteato fere hemisphærico, squamis tantum biseriatis æqualibus laxis lineari-lanceolatis, extimis folioso-appendiculatis, intimis tenuioribus inappendiculatis, floribus radii 3-8 ligulis discum subsuperantibus, disci circa 30; acheniis linearibus pubescentibus. — Collected by Prof. Brewer in the eastern part of the Sierra Nevada, on Pyramid Peak, near Carson's Pass, alt. 8-10,000 feet. — This has no just claim to a separate generic rank, but must be referred, with the preceding, to *Aplopappus*.

APLOPAPPUS MACRONEMA, *Macronema discoidea*, Nutt., of which fine specimens were distributed in Hall and Harbour's Rocky Mountain collection, is distinguished from the last by the arachnoid-woolly branches, somewhat simpler involucre, and broader leaves, as well as by the absence of rays. The achenia are not glabrous, as described.

CHRYSOPSIS (AMMODIA) BREWERI: viscoso-subpubescens, laxe paniculato-ramosa; foliis oblongis seu ovato-lanceolatis membranaceis basi lata tenuiter trinervi arcte sessilibus; capitulis (nunc nudis graciliter pedunculatis nunc foliis 1-2 fulcratis) discoideis; involucro quam discus dimidio brevioribus, squamis lanceolatis acuminatis tenuibus; acheniis obovatis plano-compressis hirtellis; pappo exteriori setuloso satis copioso. — Near Sonora Pass and Ebbett's Pass, in the Sierra Nevada, common at the elevation of 4,000 to 8,000 feet. — This is a close congener of *C.* (*Ammodia*, Nutt.) *Oregana;* but is at once distinguished by the above characters, and by its laxer inflorescence. The involucre is less imbricated and much shorter, scarcely exceeding the achenia, which are broad and flat. There is an evident setulose outer pappus, like that of *Chrysopsis villosa,* &c. A new examination of the Oregon species shows the same, only scantier. So I venture to regard Nuttall's *Ammodia* as a discoid section of *Chrysopsis.*

CHRYSOPSIS BOLANDERI: § *Achyrœa, C. pilosœ* affinis, villosior; radice perenni; foliis superioribus acutioribus, summis conformibus capitula sessilia involucrantibus vel fulcrantibus paullo superantibusque; corollis disci extus parce arachnoideis; pappo exteriori e paleolis linearibus subulatisque achenio angusto cano-sericeo vix dimidio brevioribus. — Hills of Oakland, near San Francisco, abundant, H. N. Bolander. From the general character, and the foliose-bracted sessile heads, this would seem to be Nuttall's *C. sessiliflora* (from Santa Barbara), of which I find I have no specimen, though I must some time have examined it. But the present plant shows an outer pappus as conspicuous as that of *C. pilosa* itself, although of longer and narrower scales. A few scattered, long, arachnoid hairs are borne on the upper part of the disk-corollas.

SOLIDAGO GUIRADONIS: *Virgatœ,* glaberrima; caule gracili stricto; foliis anguste linearibus elongatis integerrimis, imis lanceolatis in petiolum marginatum longe attenuatis; panicula angustissima oligocephala; capitulis parvis; involucri squamis subulatis, costa crassa; ligulis 8 – 9 flores disci 10 – 12 haud superantibus; acheniis puberulis. — Along a brook at the base of San Carlos, coll. Guirado. Stem 2½ or 3 feet high, from a ligneous rhizoma. Lowest leaves 6 inches long, less than half an inch wide; the principal cauline leaves 3 inches long and only 2 or 3 lines wide, above gradually reduced to linear-subulate bracts, venulose. Heads 2½ lines long, erect, sometimes in almost a simple raceme. A very distinct species, named for the collector, a very intelligent young native Californian assistant in the surveying party, Guirado.

WYETHIA (ALARÇONIA) GLABRA: *W. helenioidei* proxima, sed glabra, pl. m. viscosa; foliis caulinis in petiolum brevem attenuatis; pappo calyciformi e paleis 5 – 8 ovatis vel triangulatis nunc basi nunc ad medium usque coalitis. — Marin County: specimen with the large head foliose-involucrate, as in many specimens of *W. helenioides;* the cauline leaves obtuse and tapering into a short and margined petiole. Pass El Robles in Salinas Valley, south of San Luis Obispo, with a naked head (said to have the disk sometimes 4 inches in diameter, but in the specimens much smaller), and the cauline leaves more petioled. I have a radical leaf (about 1½ feet long and 4½ inches wide) and a head of this, collected by Dr. Andrews, probably near San Francisco.

W. helianthoides, Nutt. (of which, however, I have not present access to any specimen), *W. robusta*, Nutt., and *W. angustifolia*, Nutt., belong probably to one species. The following, with the aristiform pappus of the above, has the woolliness and aspect of *W. helenioides*, but much smaller heads.

WYETHIA MOLLIS: arachnoideo-lanata, ætate subdenudata; caule 1–3-cephalo; foliis oblongis ovalibus ovatisque omnibus petiolatis integerrimis; involucri squamis ovato-lanceolatis cum ligulis elongatis 10–12; acheniis linearibus e pappo breviter coroniformi longius biaristato vel in radio triaristato. — Mono Lake and summit of Sonora Pass in the Sierra Nevada. Also near Carson City, Nevada, Dr. C. L. Anderson; and in great patches on Mount Davidson at Virginia City, H. G. Bloomer. The Nevada specimens much more densely clothed with a coat of floccose white wool than those of Prof. Brewer: this may readily be rubbed off, and partly wears away from the old leaves. Radical leaves a foot or less in length, besides the stout petiole: cauline leaves 4 to 6 inches long. Scales of the involucre about an inch long, the outer and larger ones a little surpassing the disk, very woolly. Ligules an inch and a half long. Achenia about half an inch long, the subulate awns 3 or 2 lines long. — Mr. Nuttall regretted, as all must do, that this genus could not retain De Candolle's name of *Alarçonia*.

HELIANTHUS BOLANDERI: *Annui;* caule hirsuto bipedali et ultra ramoso; foliis omnibus alternis ovato-lanceolatis seu ovato-rhomboideis crebre sæpius grosseque serratis e basi attenuata trinerviis longe petiolatis; involucri squamis foliaceis lineari-lanceolatis sensim attenuatis acutissimis patentibus vix imbricatis hirsutis discum superantibus ligulas 10–12 subæquantibus; acheniis sericeis; pappi paleis 2 aristæformibus. — At the Geysers, Lake County, near Clear Lake, H. N. Bolander. The root is pretty clearly annual; and the species (with leaves somewhat like those of *H. petiolaris*, but much more serrate, &c.) is very different from any other we have. Heads small, the brown-purple disk less than an inch in diameter, the involucre resembling that of *H. decapetalus* or *H. tracheliifolius*.

HELIANTHUS EXILIS: *Annui*, hirsutus, nunc tantum scaber; caule gracili pedali et ultra ramoso; foliis (oppositis superioribus alternis) lineari-oblongis lanceolatisve subintegerrimis basi obscure trinerviis in petiolum brevem attenuatis; capitulis pro genere minimis; involucri squamis 10 – 12 lanceolatis foliaceis laxis ligulis 5 – 8 subdimidio brevioribus; paleis receptaculi aristato-cuspidatis; acheniis glabris; pappi paleis ovato-lanceolatis. — In wet places about Clear Lake, H. N. Bolander. A glabrate form from Owen's Valley, Dr. Van Horn. Leaves an inch or an inch and a half long. Heads on almost filiform peduncles; the brown-purple disk only half an inch broad. Chaff of the receptacle truncate-tricuspidate with the middle point projected into a rigid awn, all but the outer chaff carinate-winged on the back.

PUGIOPAPPUS BIGELOVII, Gray in Torr. Bot. Whipp. Exped., Pacif. R. R. Rep. 4, p. 104. Add. char. gen.: Achenia plano-obcompressa; radii fertilia, ala suberosa cincta, calva; cætera inania, disco epigyno cylindrico styli basin cingente apiculata, paleis pappi pugioniformibus demum deciduis. — Prof. Brewer collected this very little known plant on dry hills at San Buenaventura, in the southern part of California, and also received it from Fort Tejon, collected by Dr. Van Horn, with some fruit.

CHÆNACTIS XANTIANA (*C. glabriuscula* var. *megacephala*, Gray in coll. Xantus, Fort Tejon, Jour. Bost. Nat. Hist. Soc., non Bot. Whipp.): *C. heterocarphæ* affinis, sed robustior, magis glabrata, caule fistuloso; *C. glabriusculam* var. *megacephalam* æmulans sed pappo duplici, paleis 4 interioribus lanceolatis corollam subæquantibus 4 exterioribus brevissimis late cuneato-obovatis vel obcordatis; ab utraque differt involucri squamis angustioribus laxioribus, corollis ut videtur carneis, marginalibus parum ampliatis cæteras haud superantibus. (Capitula majora fere pollicaria.) — This, the No. 45 of the collection made by Xantus near Fort Tejon, I confounded, as is noted above, with a different species; but we now have it, in fine state, from Dr. Anderson, who found it near Carson City, in Nevada.

Var. INTEGRIFOLIA: foliis anguste linearibus integerrimis rariusve 1 – 2-lobatis. — Near Fort Tejon, Dr. Van Horn.

CHÆNACTIS TANACETIFOLIA: humilis, lana tenui canescens, mox glabrata; foliis plerisque radicalibus bipinnatipartitis, segmentis lobisque confertis parvis oblongis seu ovalibus obtusissimis; caulibus scapisve (3 – 4-pollicaribus) monocephalis; involucri squamis lineari-subspathulatis; corollis aureis, marginalibus ampliatis; pappo duplici e paleis 4 oblongis obtusissimis corolla (disci paullo, radii dimidio) brevioribus et 4 alternantibus minimis ovalibus. — Lake County, near Clear Lake, H. N. Bolander. A very distinct species, with Tansy-like leaves in a radical tuft, heads rather smaller than those of *C. lanosa*, and bright yellow flowers; it makes the third known species with a short outer pappus.

ACTINOLEPIS MULTICAULIS, DC., var. PAPPOSA: acheniis disci etiam pappo donatis. — Prof. Brewer's specimens, from three stations, all in Santa Barbara County, uniformly have a pappus to the disk, like that of the ray flowers. This is the same in specimens otherwise exactly resembling the plant on which the genus was founded, and in a more woolly form, gathered in Santa Maria Valley, which however, except in the pappus, would not be distinguished from Dr. Parry's specimens, figured in the Botany of the Mexican Boundary Survey. *Actinolepis* might accordingly be reduced to a section of *Bahia:* but the reception of the external achenia into a concavity at the base of the involucral scales may still enable us to keep the genus.

ACHYROPAPPUS WOODHOUSEI: humilis, ramosissimus, subviscoso-puberulus; foliis fere omnibus oppositis tripartitis, segmentis linearibus obtusis integerrimis vel intermedio trilobo; capitulis brevi-pedunculatis; involucri squamis obovato-oblongis; (floribus albidis?) ligulis parvis; cor. disci tubo gracili; pappi paleis 8 – 10 lanceolatis acutis (alternis sæpe brevioribus) nervo valido excurrente modo *Palafoxiæ* instructis. — New Mexico, Dr. Woodhouse, in herb. Durand. Apparently only a span high; the leaves all less than an inch long. Rays linear-oblong, a line and a half in length, scarcely exceeding the disk. Branches of the style tipped with a short and obtuse puberulent cone. This kind of style and the opposite divided leaves prevent us from referring the plant to *Palafoxia*, of which it has the pappus, nor will it fall into *Florestina*.

BURRIELIA LEPTALEA: fere glabra; caule vel ramis subradicalibus 1 – 3 capillaribus simplicissimis monocephalis; foliis perpaucis filiformibus parvis; involucri squamis 4 – 5 ovalibus oblongisve; ligulis totidem exsertis at disco maxime elevato brevioribus; acheniis parce hispidulis bi- (raro tri-) aristatis; aristis flores adæquantibus inferne sensim leviter dilatatis superne tenuissimo scaberrimo. — Santa Lucia Mountains, on very dry hillsides along the Nacismento River. Allied

to *B. microglossa*, and, like that species, having an acute appendage surmounting the branches of the style, and a very slender, subulate, naked-pointed receptacle! The rays are more apparent, the involucral scales wider, and the pappus more slender and rough.

LASTHENIA (MONOLOPIA) AMBIGUA: gracilis, arachnoideo-lanata; caule spithamæo ramoso; foliis alternis spathulato-linearibus lanceolatisve subintegerrimis; involucri angusto-campanulati squamis 8–9 acuminatis ultra medium connatis; ligulis ovalibus brevibus; corollis disci tubo hirsutissimo, limbo sensim ampliato glabrato; acheniis linearibus 5-gonis subglabris (exterioribus ad angulos hirtellis) nunc calvis nunc fere omnibus pappo brevi e paleis tenuibus eroso-truncatis coronatis. — Near Fort Tejon, Dr. Van Horn, in coll. Brewer. Nearly related to *L.* (*Monolopia*, Benth.) *bahiæfolia* of Hartweg's collection, which has a broader and more woolly involucre, disk-corollas with a narrower tube which is villous only in a ring at the junction with the broadly expanded limb, and hairy achenia, all, so far as known, destitute of pappus. In the present species the discovery of the pappus, conspicuous enough in some heads but wanting in others, confirms the suspicion that the *Monolopiæ* are epappose *Helenieæ*.

HULSEA ALGIDA: viscoso-villosula; caule (spithamæo) folioso monocephalo; foliis lineari-lingulatis aut repando- aut laciniato-dentatis sessilibus, imis subspathulatis, basibus dilatatis scariosis apicem caudicis crebre vestientibus; capitulo maximo; involucri squamis linearibus apice attenuatis albo-lanatis; ligulis 50–60. — High peaks of the Sierra Nevada, on Mount Dana, at 11,500 feet, and Wood's Peak, 10,500 feet. Stems several from an ascending caudex, leafy nearly or quite to the head. Leaves 1½ to 3 inches long, 3 to 6 lines wide. Head an inch in diameter. Achenia 3 to 4 lines long. Nearly related to *H. Californica*, of which I possess only a portion of an involucre (which is similar) and some flowers and achenia, the latter much smaller than in the present plant.

HULSEA VESTITA: caulibus abbreviatis e caudice subterraneo erecto folia conferta obovato-spathulata subintegerrima albo-tomentissima scaposque monocephalos gerentibus; involucri squamis oblongo-linearibus viscoso-pubescentibus; ligulis 20–30; pappi paleis conspicuis. — In dry volcanic ashes, near the summit of a volcanic hill south of Lake Mono, alt. about 9,000 feet. A remarkable species of this now well-established genus. Leaves thickly coated with matted white wool (which may at length be deciduous?), broadly-spatulate or cuneate-obovate, one or two inches long, including the long-attenuate base or petiole. Scapes from 2 to 4 inches high, naked or with a few small linear bracts, viscous-pubescent, but entirely destitute of the white wool, as is the involucre also. Head about as large as that of *H. nana*, the involucre similar. The broad and truncate, eroded, silvery paleæ of the pappus are one fourth or nearly one third the length of the silky-villous achenia.

RIGIOPAPPUS, Nov. Gen. *Heleniearum.*

Capitulum pluriflorum, heterogamum; floribus radii 5 – 8 fœmineis, ligula parva discum vix superante; disci hermaphroditis, corolla tubulosa angusta 3 – 4-dentata, dentibus brevissimis. Involucrum biseriale, floribus brevius, e squamis subulato-linearibus rigidis foliis ramealibus conformibus. Receptaculum planum nudum. Styli rami fl. herm. parte stigmatosa brevi glabra (more *Asteroidearum*) complanata in appendicem gracilem subulatam hirtellam producta. Achenia gracilia, linearia, compressa, hispidula, transverse rugulosa. Pappus simplex, e paleis 4 – 5 rigidis subcorneis aristiformibus (angusto-subulatis corollam superantibus achenio ipso paullo brevioribus) constans. — Herba annua, gracilis, puberula; foliis alternis linearibus; ramis floriferis ex apice caulis simplicis paucis filiformibus monocephalis inferne aphyllis; floribus luteolis vel albidis?

RIGIOPAPPUS LEPTOCLADUS. — Dalles of the Columbia River, Oregon, Dr. Lyall, coll. Oregon Boundary Commission; communicated from the Herbarium of the Royal Gardens, Kew.

HEMIZONIA, DC., Torr. & Gray, § HEMIZONELLA.

Capitulum modo *Harpæcarpi* pauciflorum; floribus radii 4 – 5, ligula brevissima styli ramos haud superante, disci ad unicum raro duos intra cupulam 3 – 5 dentatam reducti. Achenia omnia perfecta; radii pl. m. obcompressa, subincurva. — Herbæ annuæ, tenellæ, foliis linearibus hirsutis fere eglandulosis. Acheniis exceptis ad *Harpecarpum* referendæ.

HEMIZONIA (HEMIZONELLA) MINIMA: caule tenuissimo subpollicari 1 – 3-cephalo; foliis brevibus, summis capitula sessilia involucrantibus eaque vix superantibus; acheniis glabris, radii obovatis erostris. — Dry soil, near Soda Springs, alt. 8,680 feet. Leaves 1½ to 2 lines long, mostly opposite; the lower oval or oblong, minute. Doubtless this plant grows larger, but probably still remains different from the following species in its much obcompressed and broad achenia, the summit rounded and entirely destitute of any beak. Involucre, as in the other species, hispid-glandular on the back, completely enclosing the achenia.

HEMIZONIA (HEMIZONELLA) PARVULA: bi-tripollicaris, pilis albidis magis hispida; caule patentim ramoso; foliis angusto-linearibus, superioribus capitula sessilia involucrantibus eaque longe superantibus; acheniis glaberrimis angustis fusiformi-falcatis subtrigono-obcompressis, rostro brevi incurvo. — Klamath Valley, Oregon, Mr. Kronkite. Leaves half an inch to an inch long, half a line wide. It is this species which by the achenia most approaches the genus *Harpæcarpus*, but these are still decidedly obcompressed instead of compressed; and it would be very inconvenient now to admit compressed and obcompressed achenia into the same genus. Obviously these little plants are much reduced *Hemizoniæ*.

HEMIZONIA (HEMIZONELLA) DURANDI: caule a basi ramoso 3 – 6-pollicari; capitulis e dichotomiis plerisque pedunculatis folia fulcrantia adæquantibus; acheniis intus præsertim parce pilosis, floris centralis trigono apice truncato, radii obovato-oblongis trigono-obcompressis arcuatis, rostro brevi inflexo. (*Harpæcarpus madarioides*, Durand, Pl. Pratten. in Jour. Acad. Philad., non Nutt.) — Nevada County, California, Mr. Henry Pratten. Washoe County, Nevada, Mr. Stretch, communicated by Dr. Torrey. — Heads a line and a half in length, larger than in the foregoing species. I think this was also collected by Fremont, in his second expedition. But I possess no specimen of it.

WHITNEYA, Nov. Gen. *Heleniearum* v. *Senecionearum*, epapposum.

Capitulum multiflorum, heterogamum; floribus radii ligulatis fœmineis, disci tubulosis hermaphroditis. Involucrum biseriale, e squamis 10 – 12 æqualibus oblongo-lanceolatis acutis herbaceo-membranaceis. Receptaculum convexo-conicum, epaleatum, dense hirsutum. Ligulæ magnæ. Corollæ disci infundibuliformes, lobis breviusculis ovatis. Antheræ ecaudatæ. Stylus radii elongatus, disci ramis brevibus lineari-subulatis complanatis obtusiusculis extus hirtellis. Achenia oblonga, obcompressa, calva. — Herba *Arnicæ* facie, montium Californiæ incola; caule simplici e rhizomate gracili repente foliisque oppositis tomento tenui argentatis; capitulo specioso; floribus aureis.

WHITNEYA DEALBATA. — Dry woods on the Yosemite trail, alt. 7,000 feet. Stem simple, a foot high, naked above, and bearing a single head, or with an additional monocephalous peduncle from the axil of the uppermost leaves. Leaves entire, mucronate; the radical or subradical ones obovate or oval, 3 – 5-nerved at the base, tapering into a flat or winged petiole; the cauline usually a single pair, smaller and narrower, sessile, and sometimes connate. Rarely there are two alternate bracts. Lateral peduncles, when they occur, usually bibracteate. Involucre half an inch long, equalling the disk, tomentulose. Tube of the corolla glandular-pubescent. Ligules over an inch long, lanceolate-oblong, 7 – 9-nerved, minutely three-toothed at the apex. Branches of the style in the disk-flowers tapering into a bluntish hairy apex, but not tipped with any distinct cone or appendage. Achenia hirsute-pubescent; those of the ray flat, 3-nerved on the inner face, and obscurely so on the outer face; those of the disk apparently similar and fertile, but immature in the three specimens collected. — This handsome Composita, doubtless belonging either to the *Senecioneæ* or *Helenieæ* (although destitute of pappus), is dedicated to the eminent Geologist in charge of the Californian State Survey, Professor Josiah D. Whitney, under whose superintendence a most interesting and extensive collection of dried plants of California, especially of the high sierras, has been made.

RAILLARDIA, Gaudichaud, § RAILLARDELLA.

Achenia magis compressa. Pappus niveus. Styli rami appendice tenuiori superati. Receptaculum planum seu convexum. — Herbæ acaules, pumilæ, regionum alpinarum Californiæ montium incolæ, rhizomatibus subterraneis repentibus apice folia rosulata lanceolata subuninervia scapumque gracilem monocephalum proferentibus.

RAILLARDIA (RAILLARDELLA) ARGENTEA: foliis spathulato-lanceolatis utrinque argenteo-sericeis; involucro cylindrico 7 – 15-floro cum scapo nudo glanduloso, squamis longe ultra medium coalitis; receptaculo plano glabro. — Sonora Pass, 8,000 – 10,000 feet, and Ebbett's Pass, at about the same altitude, on dry slopes. — Leaves one or two inches long, tapering into a short petiole, subcoriaceous; the silvery-silky pubescence perhaps somewhat deciduous with age. Scape 1½ to

5 inches long, leafless and bractless. Involucre over half an inch in length, of 7 – 12 linear scales, which coalesce to near their acute tips, but are readily separable. Corolla light yellow. Branches of the style linear and gradually produced into a slender subulate appendage. Achenia linear, compressed, silky-pubescent, scarcely narrowed at the base. Bristles of the pappus softly plumose, bright white, nearly equalling the corolla.

RAILLARDIA (RAILLARDELLA) SCAPOSA: foliis subspathulato-linearibus ciliolatis cum scapo elongato inferne nunc 1 – 2-phyllo subviscosis; involucro cylindraceo-campanulato 20 – 30-floro, squamis vix ultra medium coalitis; receptaculo convexo subpiloso. — On a peak of the Sierra Nevada, N. N. E. of Soda Springs, in sunny places, at an elevation of 10,000 feet. Leaves narrower and mostly longer than in the preceding species, 2½ to 4 inches long, including the slender tapering base or petiole, wholly destitute of silvery pubescence, glabrous except a slight glandular pubescence along the margins, and viscid. Scape very slender, eight inches to a foot high. Head nearly an inch long. Receptacle showing somewhat of the hairiness and convexity of the genuine species of *Raillardia*.

These two species are, perhaps, the most interesting botanical discovery made by Professor Brewer. I had long since remarked that *Argyroxiphium* and *Wilkesia*, — very peculiar *Compositæ* of the Sandwich Islands, — represent there the *Madieæ* so characteristic of California and Oregon. We have here, in turn, two Californian plants so intimately allied to a most characteristic Hawaiian genus, *Raillardia* that, notwithstanding the difference in habit, I cannot venture to distinguish them generically.

ARTEMISIA POTENTILLOIDES: *Seriphidium*, undique incano-sericea, subpedalis; foliis radicalibus bipinnatisectis, caulinis plerisque pinnatipartitis, segmentis 3 – 11 linearibus nunc latiusculis; capitulis 3 – 6 hemisphæricis (majusculis) corymbosis; pedunculis gracilibus; involucri squamis circa 10 æqualibus obovatis, marginibus hyalinis; receptaculo convexo hirsutissimo; floribus compluribus flavis. — Nevada, near Carson City, Dr. C. L. Anderson. — A most distinct species, with a tuft of simple ascending stems and bipinnately-divided silvery leaves from a thickish caudex; the cauline leaves few and small, an inch or less in length, the uppermost reduced to simple linear bracts. Heads 4 lines in diameter, depressed; the flowers all hermaphrodite and fertile.

CALAIS ERIOCARPHA: *C. cyclocarphæ* et *Bigelovii* similis; foliis *Taraxaci;* acheniis paullo gracilioribus acute costatis; pappi paleis (quandoque 3 – 4) ovalibus integerrimis extus lanatis arista sesquibrevioribus. — Nipoma, on low hills. The woolly paleæ of the pappus present a striking feature.

CALAIS APHANTOCARPHA: *C. Bigelovii* similis; acheniis paullo gracilioribus; pappi paleis 5 minimis deltoideis subito in aristam tenuem scabram achenio longior productis. — Bushy Knob, southeast of Monte Diablo. Leaves and scapes (one to two feet high) and the whole aspect not unlike *Leontodon autumnale.* Achenia of *Eucalais,* the outermost villous. Pappus of *Scorzonella,* the paleæ being reduced to a mere basal dilatation of the slender awn, but only five in number.

STEPHANOMERIA LACTUCINA: caule subsimplici e radice perenni tenuiter puberulo ad apicem usque æqualiter folioso oligocephalo; foliis lanceolatis seu linearibus parce spinuloso-dentatis vel integerrimis; capitulis subcorymbosis; involucri (semipollicaris) squamis lanceolatis subimbricatis; floribus circiter 10. — Dry hill near Big-tree Road in the Sierra Nevada, alt. 6,000 feet. A somewhat anomalous and large-flowered species of this genus, with the aspect rather of a reduced form of *Mulgedium pulchellum.* Stem not much branched. Leaves from 1½ to 2½ inches long, sessile, not clasping. Scales of the involucre somewhat broadly lanceolate, the outer ones of various lengths, and thus gradually passing into the inner ones, making the involucre somewhat imbricated. "Flowers delicate rose-color." Mature achenia not seen; but the ovaries wholly as in *Stephanomeria.* Pappus bright white, 4 or 5 lines long.

STEPHANOMERIA? CICHORACEA: tomento tenui mox evanido glabrata; caule rigido elato, ramis virgatis superne nudis racemoso-oligo – polycephalis; foliis caulinis lanceolatis coriaceis rariter pinnatifido-dentatis vel denticulatis, dentibus spinescentibus; involucro circiter 12-floro e squamis plurimis lanceolatis gradatim imbricatis (exterioribus subsquarrosis) constante; receptaculo favoso; ligulis brevibus ut videtur roseis; acheniis lævibus; pappo sordido rigidulo breviter plumoso. — In the collection of Dr. Van Horn, from Fort Tejon, comm. to Professor Brewer. A plant of wholly doubtful genus, with the habit of *Cichorium Intybus,* but more leafy up the stems or branches; the leaves from 2 to 6 inches long, rigid, the larger ones furnished, especially toward the base, with some coarse salient teeth. Flowers larger than in any genuine *Stephanomeria;* the involucre fully half an inch in length, of more rigid and imbricated scales than in that genus; the ligules about three lines long, scarcely exceeding the tube of anthers. Achenia, still young, short, truncate, costate, with wide intervals, not at all narrowed at the summit. Bristles of the pappus 15 to 20, uniserial, somewhat coalescent at the base, 3 lines long, equalling the tube of the corolla, barbellate-plumose after the manner of a *Liatris.* Plant apparently as much as three feet high; the base of the stem not seen.

CREPIS ANDERSONII: glaber (capitulis exceptis); caudice perenni folia oblongo-spathulata vel oblongo-lanceolata laciniato-pinnatifida seu dentata subruncinata scaposque corymboso-ramosos proferente, ramis monocephalis; involucro glanduloso-pubero vel glabrato 2-3-seriali, squamis lanceolatis, interioribus attenuato-acuminatis discum fructiferum adæquantibus; acheniis fusiformibus sensim brevi-rostratis angulato-pluricostatis. — Nevada, in the vicinity of Carson City, chiefly in low grounds. Leaves 2 to 5 inches long, including the tapering base or petiole, sometimes only denticulate or dentate, sometimes pinnatifid and with the lobes laciniate-toothed. Scapes from 10 to 24 inches high, angled and strongly striate, usually leafless and with a few linear bracts. Heads three fourths of an inch in length, or sometimes smaller; the involucre more imbricated than in *C. occidentalis* and *C. runcinata.* Flowers golden yellow. Achenia about 3 lines long, smooth, angled with salient ribs and deep furrows. Pappus soft and white.

HIERACIUM BREWERI: humilis (triuncialis ad subpedalem); foliis uniformibus oblongo-spathulatis integerrimis cum caule usque ad apicem folioso pilis longis mollibus albo-villosissimis; panicula corymbosa polycephala; capitulis parvis 10-15-floris; involucro subimbricato cylindraceo vix glanduloso cum pedicellis parce piloso; floribus flavis; acheniis oblongo-linearibus haud apice vix basi angustatis. — Silver Valley in the Sierra Nevada, alt. 7,350 feet, and (a dwarfed alpine state) Silver Mountain, alt. 11,000 feet. Somewhat resembling the most hairy forms of *H. Scouleri,* Hook.; but dwarf, very leafy to the top, and canescent with very soft shaggy hairs, except the inflorescence; the latter of very numerous heads in a crowded panicle. Involucre 3 lines long.

To the account of these new *Compositæ* of Western North America I append the characters of a striking new genus belonging to the Sandwich Islands, recently discovered by Mr. Horace Mann.

HESPEROMANNIA. Nov. Gen. *Mutisiacearum*.

Capitulum homogamum, multi- et æqualiflorum, discoideum, floribus hermaphroditis. Involucrum campanulato-turbinatum, multiseriale; squamis chartaceo-rigidis obsolete nervatis, mucronato-acutis, interioribus lineari-lanceolatis, exterioribus sensim brevioribus. Receptaculum planum nudum. Corollæ subcoriaceæ, angustæ, subregularis (leviter bilabiatæ, $\frac{2}{3}$, extus intusque glabræ, tubo 5-nervi), laciniis longis linearibus erectis. Filamenta imo tubo corollæ inserta, e fauce exserta: antheræ lineares, brevissime caudatæ, caudis truncatis ultra articulum haud productis. Stylus filiformis, ramis brevissimis angustis acutiusculis. Achenium oblongo-lineare, angulatum, erostre, glabrum. Pappus multiserialis, setis rigidulis scabris. — Arbuscula inermis, glaber; foliis obovato-oblongis subserratis penninerviis breviter petiolatis ad apices ramorum brevium confertis; capitulis terminalibus subumbellatis brevi-pedunculatis ea *Chuquiragæ insignis* æmulantibus; floribus flavis.

HESPEROMANNIA ARBORESCENS. — On the highest part of Lanai, one of the Sandwich or Hawaiian Islands; coll. Horace Mann and W. T. Brigham.

This is specially interesting as being the only known *Labiatiflora* from any of the proper Pacific Islands. These *Compositæ*, so characteristic of South America, appear to be wanting even in Juan Fernandez. As the present plant does not fall into any published genus, it would appropriately bear the name of its discoverer, Mr. Horace Mann, the latest and one of the most ardent explorers of the botany of the Sandwich Islands, who has gleaned not a few novelties in a field which has been harvested by numerous botanists, from Nelson and Menzies, in the times of Cook and Vancouver, down to Remy in 1851–1853. The name of *Mannia*, however, having been already bestowed upon a genus of *Simarubeæ*, in commemoration of the arduous botanical services of Mr. Gustavus Mann in Tropical Africa, I venture, in the generic appellation here proposed in compliment to our Western young botanist of the same name, to compound the word by a distinguishing prefix.

The genus belongs to the *Flotowieæ*, according to Weddell's neat arrangement: and agrees with *Chuquiraga* and *Doniophyton* in having the long filaments free from the corolla down almost to its base. But the merely scabrous copious pappus, and naked and glabrous receptacle, as well as the corolla glabrous within, and the achenia, wholly separate it from these andine genera. On the other hand, it quite as much resembles the Brazilian and Cuban *Stiftia* and *Anastraphia;* but in the latter of these genera the filaments are adnate almost, and in the former quite, to the sinuses of the corolla; while the anthers in both of them are long-tailed, and the lobes of the corolla more or less revolute.*

Two well-marked new Ferns, which the explorations of the California State Geological Survey have brought to light, are characterized by Professor Eaton as follows: —

PELLÆA BREWERI, *D. C. Eaton* (sp. nov.): caudice brevi assurgente; stipitibus bi-tripollicaribus confertis fulvo-nitentibus teretibus fragillimis basi paleis angustissimis fulvis obtectis; frondibus tri-quadripollicaribus oblongis pinnatis, pinnis brevi-petiolatis membranaceis pellucidis plerumque bipartitis, segmento superiori majore, segmentis pinnisque superioribus ovatis vel triangulari-ovatis basi cuneatis, venis liberis pluries furcatis; sporangiis ad apices venularum paucis indusio continuo tenui revoluto velatis. — Rupestris inter montes *Sierra Nevada* Californiæ, altitudine 7,000-9,000 ped. super mare. Prof. W. H. Brewer, n. 1919, 2102, 2038.

ASPIDIUM (POLYSTICHUM) CALIFORNICUM, *D. C. Eaton* (sp. nov.): elatum, insigne; frondibus oblongo-lanceolatis pinnatis, pinnis confertis lanceolatis falcatis acutissimis basi superiori auriculatis, imis vix minoribus, inferioribus pinnatifidis, mediis pinnatilobatis, supremis gradatim minoribus spinuloso-serratis, lobis ovato-oblongis spinuloso-apiculatis subtus paleis angustis conspersis supra glabris, venis pinnatis liberis, pinnis fere omnibus soriferis; soris confertis; indusiis teneribus orbiculatis ciliatis pedicello brevi gracili suffultis; rhachi stipiteque paleis difformibus instructis aliis magnis lato-lanceolatis aliis minoribus

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* In *Stiftia chrysantha* I do not find the tube of the corolla 10-nerved, nor the branches of the style acute; the latter are rather spatulate and very obtuse.

anguste linearibus ciliatis. — In montibus Californiæ prope *Santa Cruz*, H. N. Bolander. Frons fere bipedalis, 5 – 6 poll. lata. Stipes pedalis et ultra. E grege *A. lobati*, sed aspectu et elegantia *A. munitum* referens.